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IN TWO PARTS
(Part One)

Maintenance of a Continuing Supply of New Faculty Members. *Joseph C. Hinsey* 379

Health Legislation and the Shortage of Physicians. *Wilburt C. Davison* 396

A Domiciliary Medical Care Program as an Integrated Facility in the Medical Curriculum. *Henry J. Bakst* 406

Teaching the Anatomy of the Nerve Supply of the Abdominal Digestive Tract. *Charles F. DeGaris*..417

Medical College Admission Test. *John M. Stalnaker*.....428

Modification of Cooperative Plan for Appointment of Interns.....435

A Proposal for Supplementing the Cooperative Plan for Appointment of Interns. *F. J. Mullin*...437

Editorials 443

College News 447

General News 455

Book News 458

Index 461

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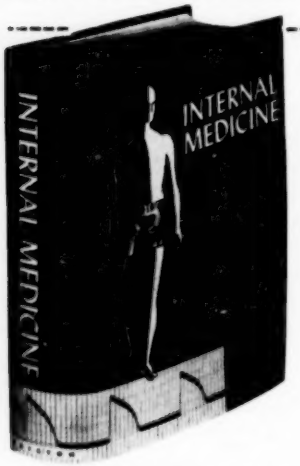

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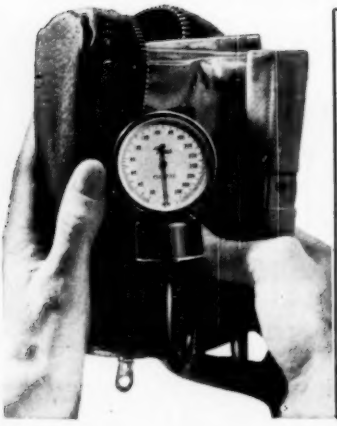

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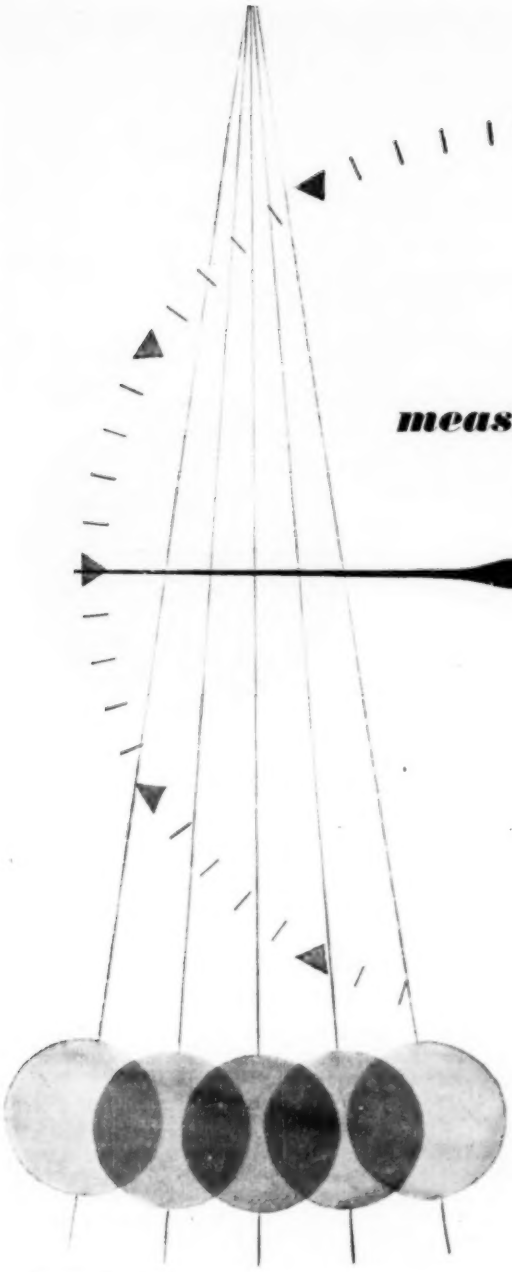

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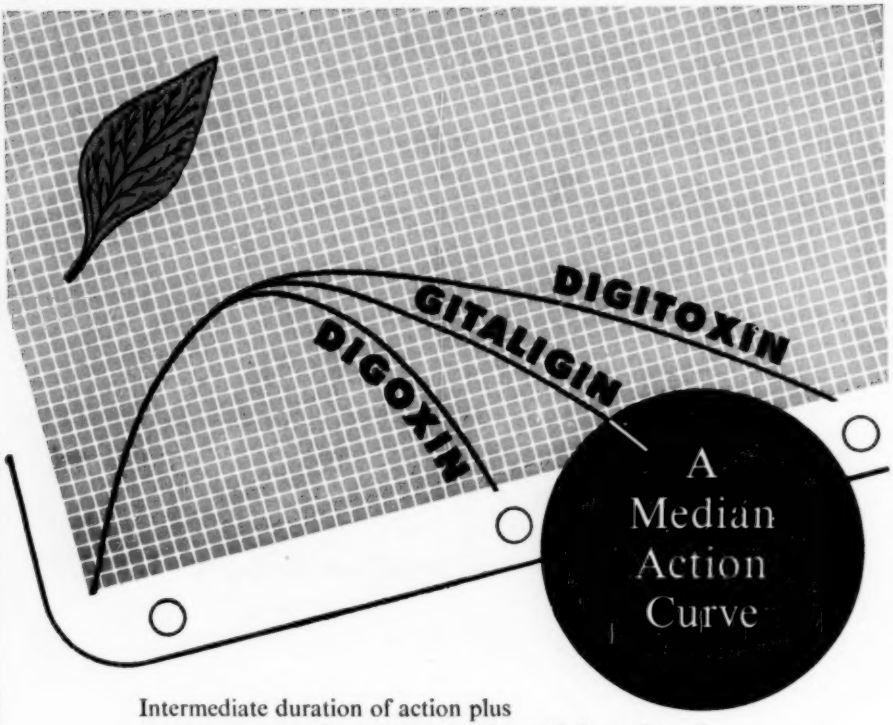

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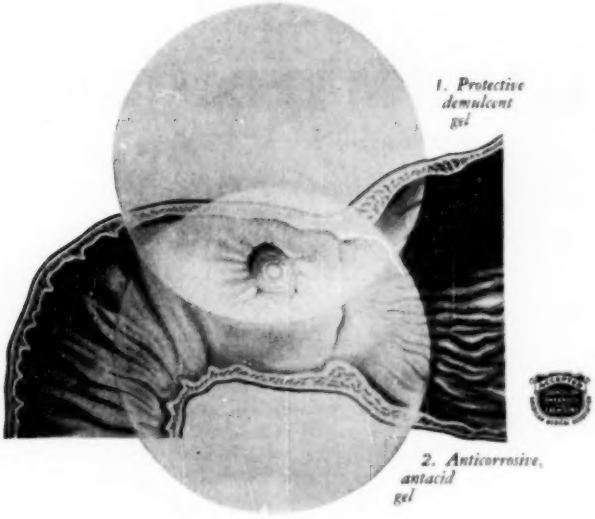

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Maintenance of a Continuing Supply of New Faculty Members*

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New York, N. Y.

In presenting an address as your President at this sixty-first annual session of the Association of American Medical Colleges, I feel obligated to present a few of the problems that have been giving me concern. I am certain that these problems are not unique, startling or new. Before embarking on this discourse, I should like to comment on the present state of our Association. The reports of our various committees outline progress and failure in a number of directions. I am deeply indebted for the cooperation we have received from our full time staff and from the many members who have contributed so generously of their time. There has been a spirit of team play which has been very helpful.

Progress has been made in a number of areas; i.e., in the work of the Joint Committee on Medical Education in Time of National Emergency where representatives of our Association have joined with representatives of the Council on Medical Education and Hospitals of the American Medical Association in the preparation of a statement to the National Security Resources Board. We have had the continued cooperation of the various governmental agencies and military services. The appointment of the Health Resources Advisory Committee of the National Security Resources Board, under the chairmanship of Dr. Howard A. Rusk, and of this same committee as a National Advisory Committee to Selective Service brings hope of a better solution of problems related to the allocation of medical manpower. We are grateful to Dr. Rusk for coming here today to bring us the latest information about the program to which we have looked forward.

In reviewing the history of our Association in his address[1] last year, Dr. J. Roscoe Miller pointed out that our problems have fallen, in general, into three groups: (1) premedical education, (2) questions relating to instruction and (3) finances. Today, I want to review what I consider to be one of our most important problems—the maintenance, recruitment and improvement of our teaching staffs in our medical colleges.

*President's Address delivered at the Sixty-first Annual Meeting of the Association of American Medical Colleges held in Lake Placid, New York, October 23-25, 1950.

1. Miller, J. Roscoe: "Address of President," J. A. Am. M. Colls., 25: 1-6, 1950.

We are all aware of the pressure for increasing the number of students in our medical colleges. We have received little, if any, recognition for the increase from 5,794 entering first year students in 1939 to 7,042 in 1949. With new schools to be put in operation and other planned increases, one may anticipate that this number will be 7,500 in the near future. Each one of our colleges will be called on in the very near future to determine what increase in its student body can be made. When numbers of students are increased, there must be an increase in the teaching staffs if quality of instruction is to be maintained.

In a time of "creeping" mobilization during which we are passing, members of our teaching staffs have been called into active military duty under a program which has made inadequate provision to prevent encroachment on essential teaching staffs. On October 2, 1950, Gerald G. Gross, in his Washington Report on the Medical Sciences stated: "The whole medical manpower situation is in a muddled state." We have confidence that Dr. Rusk and his committee will get things straightened out so that medical manpower will be allocated fairly. Many of us believe that this is one of the most urgent problems facing Dr. Rusk and his committee. Fortunately, General Lewis B. Hershey and Colonel Richard Eanes have been of great help in establishing protection for our medical students as well as students in preprofessional preparation.

In the statement to the National Security Resources Board, the Joint Committee on Medical Education in time of National Emergency has used a formula that brings a need for 3,500 faculty members for 14,000 students in the first two years of our medical schools and 4,250 faculty members for 12,750 students in the last two years. This would total 7,750 full time faculty members, many of whom would not be physicians. Mr. John M. Stalnaker is endeavoring to gather information about the present number of faculty members.

After discussion of the various factors which made for adequate teaching, this report continues,

"The maintenance of a continuing supply of new faculty members is as great a need as is the continuous supply of premedical and medical students. This is true for both basic science and clinical faculty. To maintain the flow of basic science faculty, graduate students in the basic sciences, both in college and medical school must be deferred for study, teaching and research. The failure to do this in World War II produced a severe shortage in supply of basic science preclinical faculty, a shortage from which we will suffer and which would be seriously exaggerated if a more intelligent policy were not put into effect in the present emergency. To maintain the supply of clinical and, often, of important basic science faculty members, a residency training program in teaching hospitals must continue uninterrupted. A policy of deferment of interns and senior residents only, means that for all practical purposes next year there will be no residents."

This policy fails to take into consideration the basic principles of a residency system and can only mean a rapid deterioration of one of the most important elements in our whole system of medical education. It is to be hoped that this policy will be changed so that medical education and medical care in civilian institutions will not be affected adversely.

Working under the pressures in his institution, the Dean of a medical school, as a rule, is not inclined to survey the staff situation in all of our institutions. In the work of the Survey of Medical Education, Dr. John Deitrick and his staff are accumulating significant information which will be available when the final report is written. In the annual report of the Rockefeller Foundation for 1941, Dr. Alan Gregg described the establishment of the William Henry Welch Fellowships in Internal Medicine. This was done because Dr. Gregg and his colleagues analyzed the Departments of Medicine over the country and found that in the decade from 1948 to 1958,

"A large number of important chairs in medicine will become vacant because of the retirement of men in the same age group who were active in the vigorous reorganization and progress in American medicine which took place in the second decade of this century. Men to replace them should now be receiving experience and training but under present circumstances the necessary opportunities may be lacking unless special efforts are made."

The report then went on to describe the financial predicament of our medical schools. This was serious then, but it has become critical during the past nine years. The Commonwealth Fund has supported fellowships in the field of Public Health and Psychiatry over a period of years.

After Mr. John Russell became Director of the John and Mary R. Markle Foundation at the end of World War II, he surveyed the needs of our medical schools to determine where the Foundation could be of greatest service. Recently, our Association has received a grant for its Committee on Student Personnel Practices and one for the work of the Survey of Medical Education in a study of preprofessional training from the Markle Foundation. However, one of the finest contributions to medical education they have made under Mr. Russell's leadership is the establishment of the Markle Postgraduate Scholarship Program for sustaining and encouraging promising young members of our faculties who may become the future leaders in medical education and research. One of its great merits is the assurance of adequate support over a period of five years.

Mention should be made of the extensive fellowship programs that have been in operation on the part of various governmental agencies. As important as these have been, numerous ones of them have not permitted sufficient teaching experience on the part of the recipients in order to train them properly for staff positions.

At the annual meeting of the American Association of Anatomists in April 1949,[2] a Committee on the Survey of Economic Status and Professional Opportunities of Anatomists reported on a study that they made in a very careful manner. Their opening paragraph is one that should receive the most careful consideration of each one of us here.

"Recruitment of medical scientists is one of the foremost obligations of medical educators. It is not enough that our energies be devoted to the education of physicians. We are all repeatedly assailed by demands for more doctors, for less emphasis upon research and more upon what the shortsighted claim to be our primary task. We all know that good teaching and scholarly research are inseparable, and each is a function of every department within the University. It is to be hoped that we all still believe that progress in medicine is determined by

2. Report of the Committee on Survey of Economic Status and Professional Opportunities of Anatomists, Anat. Rec., 105: 31-62, 1949.

the achievements of research in the basic sciences. If this fundamental premise be sound, then the recruitment into and the retention of first rate minds in the basic sciences,—and one most certainly includes anatomy among them—, becomes a matter of utmost and immediate importance."

They showed that 55 professorships will become vacant from retirement in the next ten years. On the basis of questionnaires (70 per cent return), it was reported for the year 1948-1949, there were 107 vacancies and that 217 added personnel were needed. On the basis of the 1948 list of members of the American Association of Anatomists, there were 139 full professors, 102 associate professors, 87 assistant professors and 20 instructors in departments of anatomy in medical schools. This shows pyramiding in the wrong direction, although it is open to the criticism that it has not included non-members.

In their report on the "Financial Status and Needs of Medical Schools[3]," Dr. Lowell Reed and his Committee on Medical School Grants and Finances have discussed, on pages 45 to 49, the staff vacancies in our medical schools for the year 1948-1949 and in Appendix Tables 19, 20, 21, 22 and 23 have listed the data they have accumulated. For example, on the Senior Staffs of the 72 four year medical schools, there was a 7 per cent vacancy based on the reports from deans and other responsible administrative officers. These vacancies were greatest in the ranks of assistant professor and instructor. On page 48 they state, "Most frequently stressed were needed additions to the staff in basic sciences and to full time faculty in clinical departments." On page 49, we find this statement,

"The most frequently expressed need was for faculty in the basic sciences. The interruption of graduate training during the war reduced the reserves of replacements for positions in the preclinical departments. Furthermore, the lag in increasing academic salaries has reduced the incentives for young physicians to prepare for and accept teaching positions in the basic sciences. At some schools, deans indicated that positions of responsibility have remained vacant for several years. The problem seems to be particularly acute in departments of pathology, probably because of the demand in hospitals for personnel qualified in this field."

In the 50th Annual Report of the Council on Medical Education and Hospitals of the American Medical Association, Dr. Anderson and Mrs. Tipner[4] pointed out, "Medical Schools are still experiencing difficulty in finding qualified teachers to fill vacant or newly created positions on their instructional staffs. The number of schools reporting vacancies, however, and the total number of vacancies are smaller than those of last year. All medical schools submitted information on the number of full time positions on their teaching staffs for the academic year 1950-1951 that they had been unable to fill up to June, 1950. In the United States, 20 schools reported that they had no unfilled positions. Fifty-four had a total of 175 unfilled positions in the preclinical departments. Thirty-two schools reported a total of 104 unfilled positions in the clinical departments." Their tabulation showed 40 vacancies in anatomy, 34 in pathology, 28 in biochemistry, 24 in microbiology,

3. Financial Status and Needs of Medical Schools—A Preliminary Report of the Surgeon General's Committee on Medical School Grants and Finances. Federal Security Agency, Public Health Service, Washington, 1950.

4. Anderson, Donald G. and Tipner, Anne: "Medical Education in the United States and Canada," J. Am. M. A., 144: 109-181, 1950.

21 in physiology, 16 in pharmacology, 11 in physiology and pharmacology and 1 in biophysics. In the clinical departments, there were 18 vacancies in internal medicine, 16 in psychiatry, 15 in public health and preventive medicine, 13 in pediatrics, 13 in surgery, 9 in obstetrics and gynecology and 6 in radiology and the remainder in medical and surgical specialties.

In medical education, the three essential ingredients that are known to all of us are our students, our staff and appropriate facilities for their work. In the work of our Association, we have placed great emphasis on studying the problems associated with choosing our students and we have a Committee on Student Personnel Practices. I am convinced that we should be giving more thought and consideration to the problems associated with recruitment and maintenance of adequate staffs in our institutions. How well are we staffed at present and what are we doing to look ahead 10 or 15 years? If increases are indicated in certain fields, we should begin to plan to meet those needs because it takes time to develop the type of individuals we will require and, needless to say, more money than most of us now have. In addition to the needs discussed here for our own institutions, we know that our staffs are being called away to hospital, industrial and governmental positions. This competition is with institutions which have financial resources far in excess of anything back of our medical colleges at present.

Because of problems inherent in an analysis of our clinical departments with the method we have employed, we have limited our study to the preclinical departments. We requested from each medical school in the United States the latest catalogue. With one or two exceptions, we have access to the catalogue for the year 1949-1950, and for these we used the one for the previous year. From these catalogues, we obtained the names, ranks and degrees of the teaching staff in the preclinical departments. The ages of these individuals were checked in the 1949 edition of the American Men of Science and in the 1950 edition of the American Medical Directory. Unfortunately, there were a few ages which we could not determine, but we decided against questionnaires or approaching the individuals.

Because of variations in the use of titles, we decided to deal with the ranks of professor, associate professor, assistant professor and instructor. This has the deficiency that it omits consideration of assistants and fellows. However, I believe that this would be balanced to some extent by the inclusion in our analysis of staff members who actually do little, if any, teaching. I know of one department where there are 3 full professors where only one does any amount of teaching. Furthermore, in many instances the assistants and fellows require considerable instruction from the senior staff. The staff listings in clinical departments in many catalogues contain names of many men who do very little teaching. In one faculty with a total of 658 members, 221 were listed in the department of medicine. This gives a false impression of the full time equivalent in that department as well as for the school as a whole. Where there were combined departments, we have arbi-

FIG. 1—PROPORTION OF STAFF MEMBERS WITH M.D. DEGREE IN VARIOUS RANKS—ANATOMY

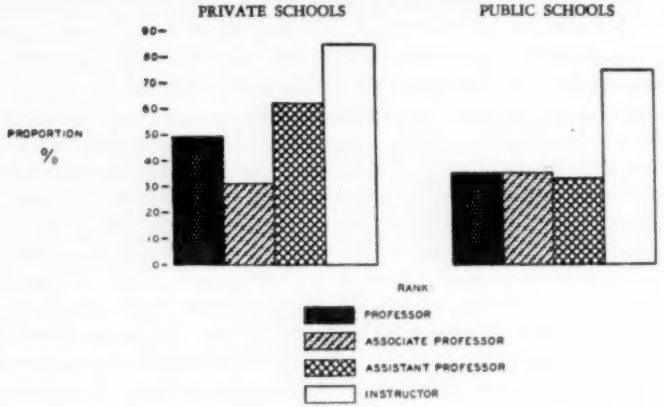


FIG. 2—PROPORTION OF STAFF MEMBERS WITH M.D. DEGREE IN VARIOUS RANKS—BACTERIOLOGY

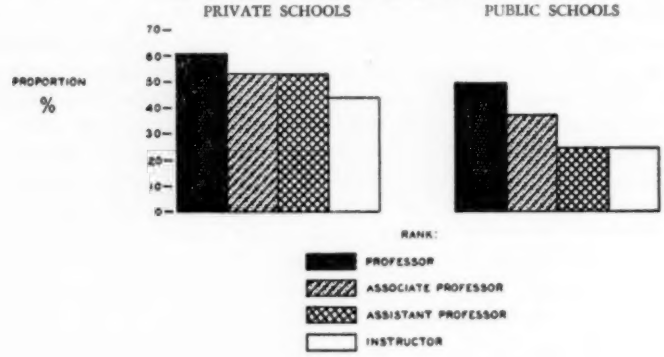
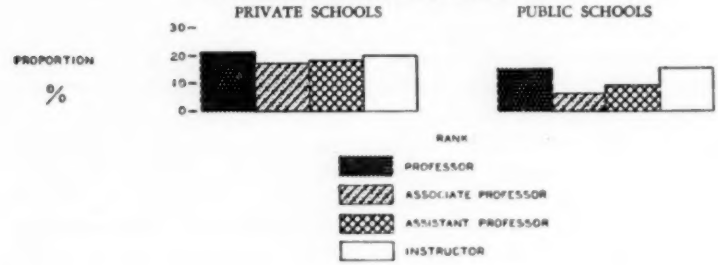


FIG. 3—PROPORTION OF STAFF MEMBERS WITH M.D. DEGREE IN VARIOUS RANKS—BIOCHEMISTRY

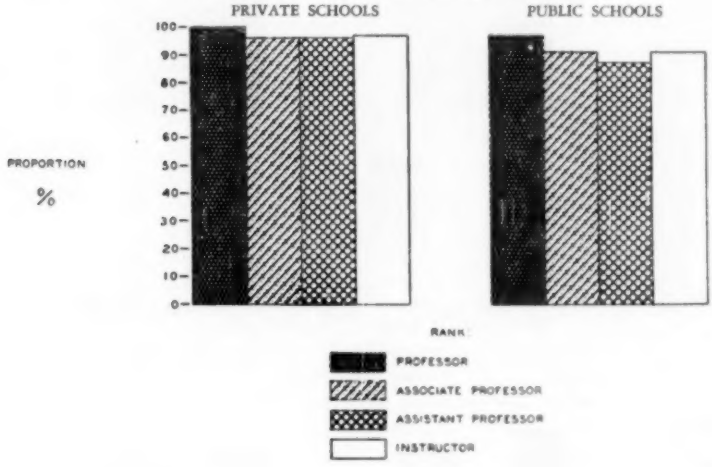


trarily divided individuals into halves. We have studied only member colleges in the United States.

For the sake of detecting any trends between private and public schools, we have separated the data between these two with 41 private schools and 37 public supported ones. In presenting this material[5], I am fully aware that there are deficiencies in the over all data studied, but at the same time I firmly believe that there are some important leads. These charts speak for themselves and I shall leave the interpretations, in the main, to each of you.

The preclinical departments have recruited many of their staff members from individuals coming from backgrounds of graduate training in the

FIG. 4—PROPORTION OF STAFF MEMBERS WITH M.D. DEGREE IN VARIOUS RANKS—PATHOLOGY



medical sciences or in the physical and biological sciences of our colleges and universities leading to the doctor of philosophy or science degrees rather than the doctor of medicine degree (Figs. 1-6). Biochemistry has a relatively small proportion of its staffs who have the medical degree and pathology has the highest proportion. In anatomy, there appears to be some increase in the proportion of instructors with the medical degree but this does not necessarily mean that they are all headed for academic careers in this field. There is indication of some reduced interest of those with a medical degree to enter bacteriology. This series of charts shows, without question, the importance of continued training of graduate students in the basic sciences in medical schools and in the physical and biological sciences in universities. We must continue to depend on them for an important segment of our leadership and it would be a calamity to repeat the mistakes of World War II.

5. The author is indebted to Miss Sally Dusinberre for her help in collecting these data and to Mrs. Ruth Z. Gold for the analysis she made of them.

The work done by our staff members of nonmedical backgrounds has contributed greatly to the vitality, progress and eminence of American medicine.

Figures 7 through 12 summarize the median ages of our staffs in the various ranks in the preclinical departments. Figure 13 shows the proportion of professors over 60 years of age, and reference to figures in the chart

FIG. 5—PROPORTION OF STAFF MEMBERS WITH M.D. DEGREE IN VARIOUS RANKS—PHARMACOLOGY

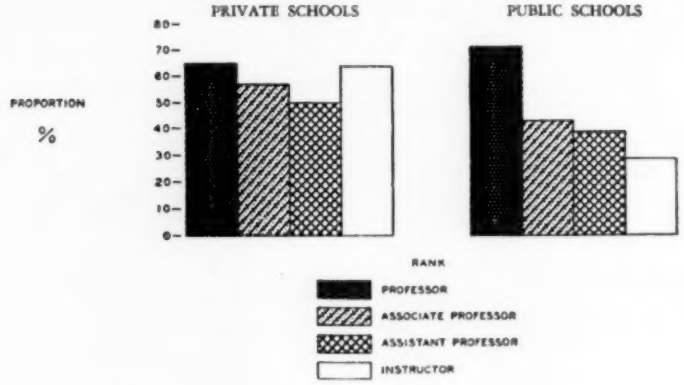
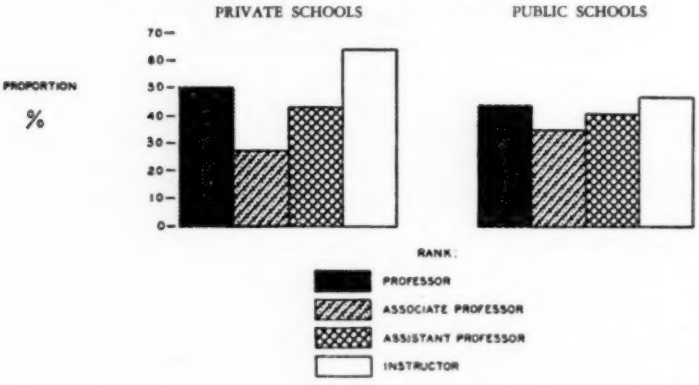


FIG. 6—PROPORTION OF STAFF MEMBERS WITH M.D. DEGREE IN VARIOUS RANKS—PHYSIOLOGY

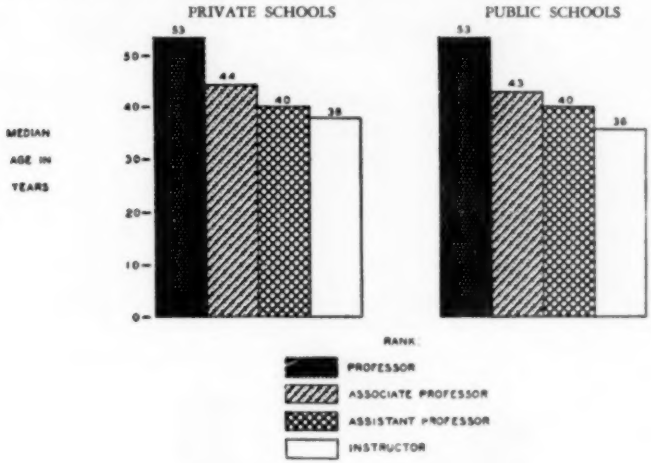


makes it clear what our replacement problem will be in the full professor rank. In the next few years, we must appoint some 45 professors of anatomy, 25 in biochemistry, 18 in bacteriology, 29 in physiology, 13 in pharmacology and 32 in pathology. Figure 14 shows the number of associate professors who are over 60 years of age. Information of this kind should be of great

help in recruitment of younger staff members because it demonstrates that there are openings ahead in replacements of present posts as well as in opportunities that will arise in newly developing medical colleges and in expanding programs in aready existing ones.

Figures 15 through 20 show the distribution in the ranks in the various fields starting at the rank of instructor. There are several things that are impressive about this distribution. There seems to be a tendency to have a larger proportion of full-professors in the publicly supported schools (Figs. 15, 16, 18, 19, 20). Furthermore, there is little evidence of a larger number in the lower ranks as would seem desirable to provide for attrition and for increased

FIG. 7—MEDIAN AGE OF STAFF MEMBERS IN VARIOUS RANKS—ANATOMY



demands of larger enrollments and starting of new schools. The inclusion of assistants and fellows would improve this picture, but for good reason they were omitted from this analysis. Possibly, the average department in a medical school is so small that this type of even distribution is inescapable. I know from personal experience that there has been a tendency to use our budget to hold older and more experienced personnel at the expense of placing enough for training at the instructor level. It would seem to me that we would be in a far healthier position if our numbers showed a ratio of three in the two lower ranks to two in the two upper ones.

Figs. 21 and 22 show the total numbers of staff determined in this analysis. The ratio of staff to students in the private schools is 1 to 4.8 and in the public supported ones of 1 to 5.5 with an over all ratio of 1 to 5.1. The total staff in these departments in all our schools was 2,614, without including assistants and fellows. However, there are a considerable number included who do very

FIG. 8—MEDIAN AGE OF STAFF MEMBERS IN VARIOUS RANKS—BACTERIOLOGY

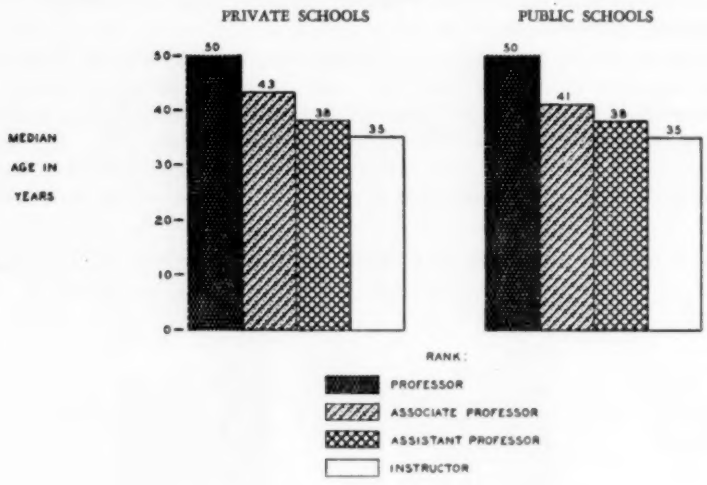
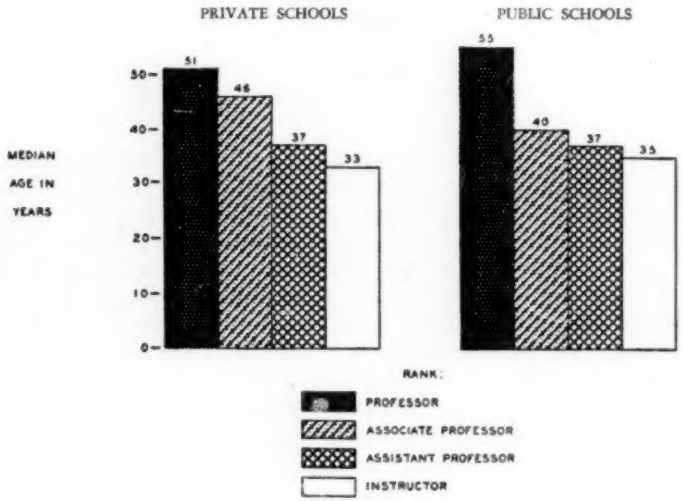
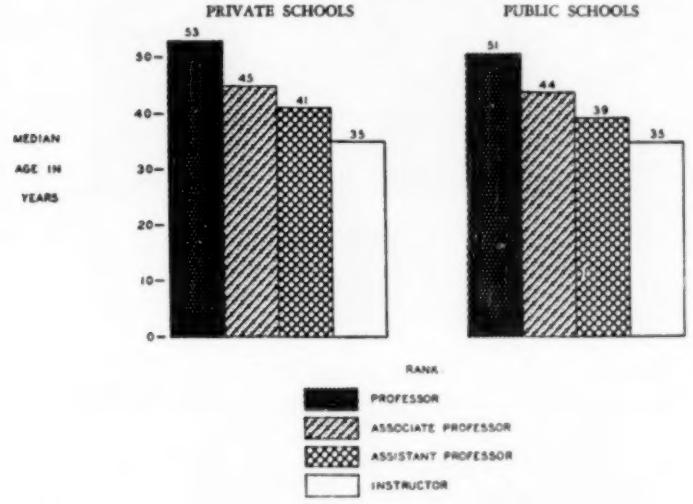


FIG. 9—MEDIAN AGE OF STAFF MEMBERS IN VARIOUS RANKS—BIOCHEMISTRY



little, if any, teaching. Dr. John Deitrick has emphasized the large amount of teaching that is done beyond that for the medical students. Dr. Anderson and Mrs. Tipner have stated that in 1949-1950, there were 1,125 physicians working toward advanced degrees and 2,094 students working for advanced degrees in the basic medical sciences in medical colleges in the United States for a total of 3,219. There were 2,720 nonmedical students reported taking courses in medical schools from schools of dentistry, public health, nursing, engineering and liberal arts colleges. A total of 1,087 physicians enrolled in

FIG. 10—MEDIAN AGE OF STAFF MEMBERS IN VARIOUS RANKS—PATHOLOGY



formal basic science courses; 17,930 physicians took refresher or continuation courses. In addition, there were the responsibilities involved in participation in the training of interns and residents. In all these categories, a conservative figure of 32,506 students in addition to 25,103 undergraduate medical students received some training in our medical schools.

I shall not embark at this time on the implications of all these additional students in the problem of determining the cost of the education of an individual medical student. Dr. Deitrick does that superbly. However, I want to impress what this means in terms of the teaching load in all departments. It is my firm conviction that, by and large, at the present time we are understaffed and that we had better face the issue. Of course, we need more money if we are to maintain adequate standards. Granted that the money should become available, it is important that each of us face up to our responsibilities in our own institutions. We all know the long term effect of too much in-

breeding and the great value of interchange of personnel. However, we must do more than just out-bid some other institution for our manpower. By so doing, we transfer the problem to one of our fellow deans who already has enough trouble. Each of us must train more men to contribute to the over

FIG. 11—MEDIAN AGE OF STAFF MEMBERS IN VARIOUS RANKS—PHARMACOLOGY

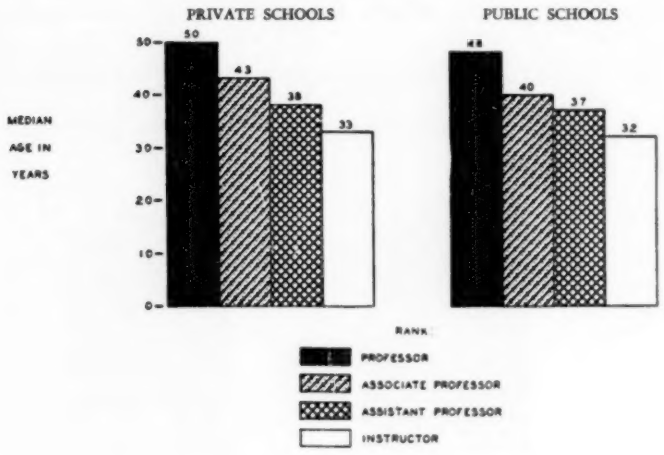
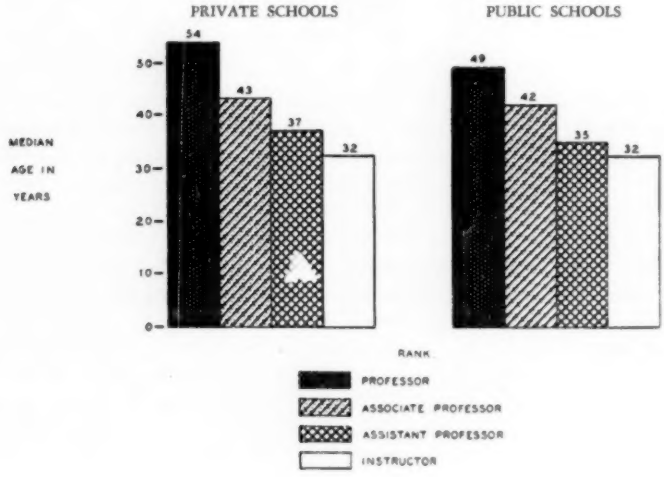


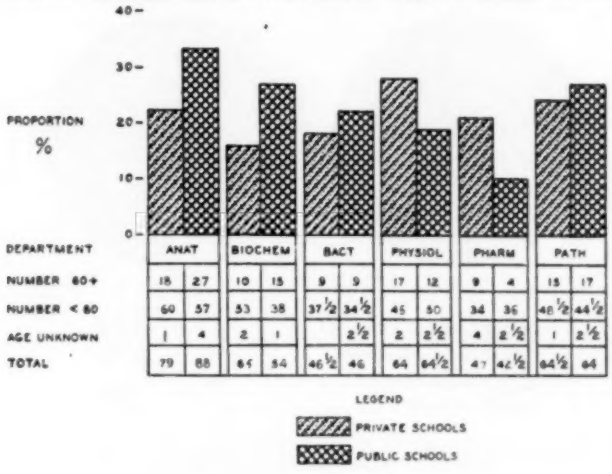
FIG. 12—MEDIAN AGE OF STAFF MEMBERS IN VARIOUS RANKS—PHYSIOLOGY



all pool of available teaching staffs, and we must sell the importance of this to whatever agency is charged with the allocation of manpower in this emergency.

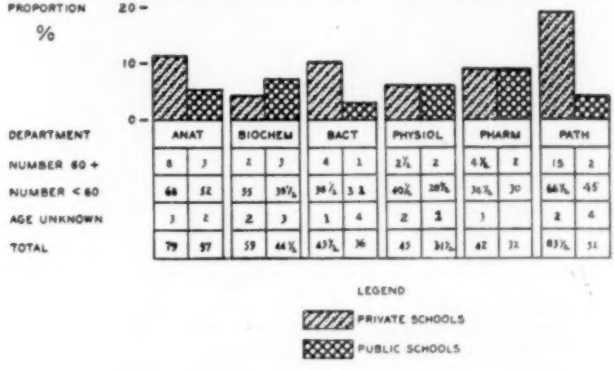
I think there are elements in this situation beyond the financial ones, such

FIG. 13—PROPORTION OF PROFESSORS OVER 60 YEARS OF AGE



DEPARTMENT	ANAT		BIOCHEM		BACT		PHYSIOL		PHARM		PATH	
NUMBER 60+	18	27	10	15	9	9	17	12	9	4	15	17
NUMBER < 60	60	57	53	38	37½	34½	45	50	34	36	48½	44½
AGE UNKNOWN	1	4	2	1		2½	2	2½	4	2½	1	2½
TOTAL	79	88	65	54	46½	46	64	64½	47	42½	64½	64

FIG. 14—PROPORTION OF ASSOCIATE PROFESSORS OVER 60 YEARS OF AGE



DEPARTMENT	ANAT		BIOCHEM		BACT		PHYSIOL		PHARM		PATH	
NUMBER 60+	8	3	2	3	4	1	2¾	2	4¾	2	15	2
NUMBER < 60	66	52	55	39⅞	38¼	33	40¾	28⅝	36⅞	30	66⅞	45
AGE UNKNOWN	3	2	2	3	1	4	2	3	3		2	4
TOTAL	79	57	59	44⅞	43¾	36	45	34⅜	42	32	83⅞	51

as the location of many of our medical colleges in metropolitan areas where living costs are high and where some of our faculty members miss the advantages of a university community. The Committee of Anatomists pointed out that: "learning still remains an occupation with little inherent social status in the United States." We should protect our staffs from over loaded teach-

ing schedules to provide and maintain opportunities for scholarly and investigative pursuits. We should point out the opportunities that will open up and become available. As far as it is possible, we should give assurances

FIG. 15—DISTRIBUTION OF RANKS IN 41 PRIVATE SCHOOLS AND 37 PUBLIC SCHOOLS—ANATOMY

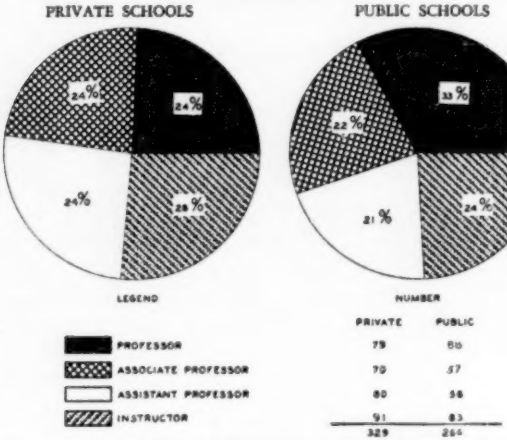
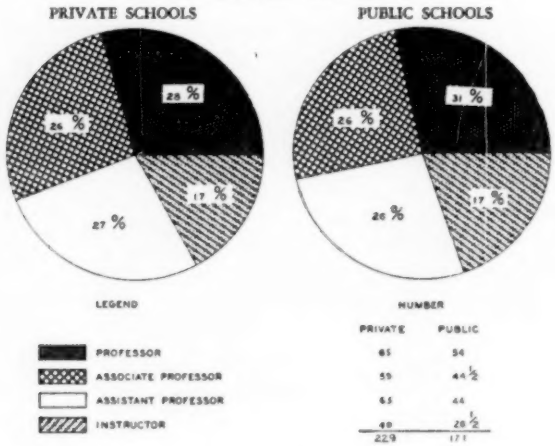


FIG. 16—DISTRIBUTION OF RANKS IN 41 PRIVATE SCHOOLS AND 37 PUBLIC SCHOOLS—BACTERIOLOGY



that we will not sell out our standards and go in for an expansion for which we do not have the available staffs and the required financing.

Although many of my remarks and the analyses I have made have been confined to problems of the preclinical fields, I am fully aware of those that

face us in our clinical departments. Here, again, many of them involve financing and methods of compensation together with new trends in payment for medical service. It is becoming increasingly difficult to maintain and de-

FIG. 17—DISTRIBUTION OF RANKS IN 41 PRIVATE SCHOOLS AND 37 PUBLIC SCHOOLS—BIOCHEMISTRY

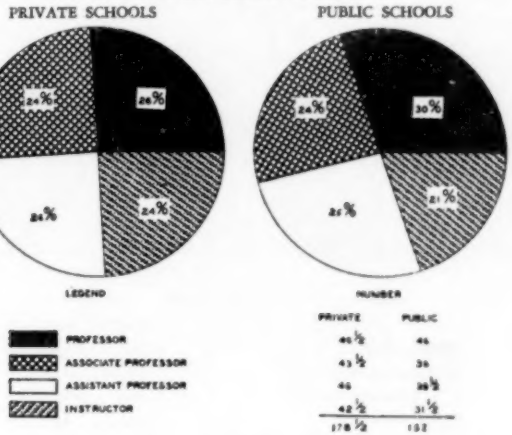
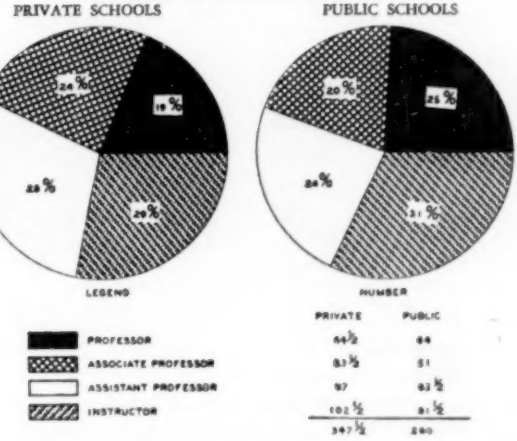


FIG. 18—DISTRIBUTION OF RANKS IN 41 PRIVATE SCHOOLS AND 37 PUBLIC SCHOOLS—PATHOLOGY



velop the strictly full time staffs in the light of our present economic situation and in face of the opposition of organized medicine. The geographic full time system presents difficulties in adjustment of demands of private practice to institutional obligations for teaching and research and in providing hospital

beds and intramural office space. Furthermore, it tends to prevent staff members leaving one institution where they are well established to go to another medical school where a new start must be made. The financial problems of

FIG. 19—DISTRIBUTION OF RANKS IN 41 PRIVATE SCHOOLS AND 37 PUBLIC SCHOOLS—PHYSIOLOGY

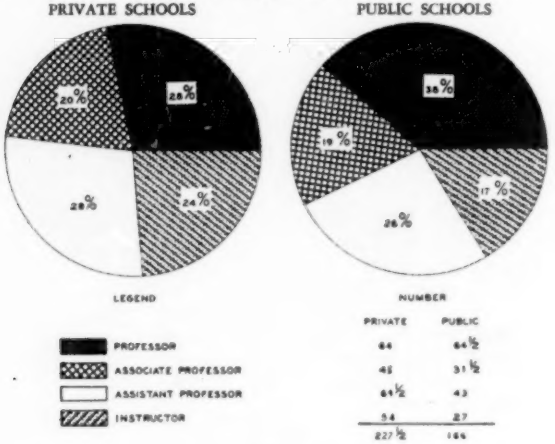
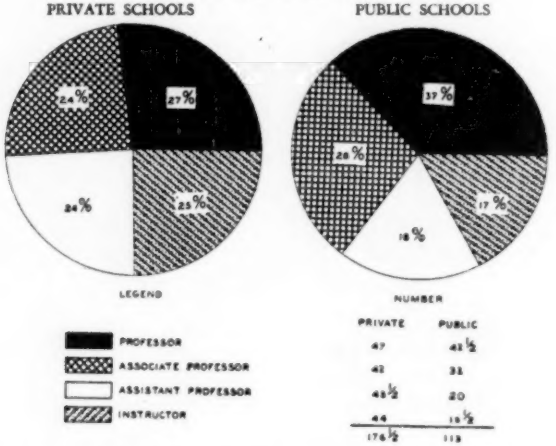


FIG. 20—DISTRIBUTION OF RANKS IN 41 PRIVATE SCHOOLS AND 37 PUBLIC SCHOOLS—PHARMACOLOGY



our teaching hospitals have placed additional administrative responsibilities and loads on our clinical teachers who had been previously over loaded. In spite of all these difficulties, academic careers in clinical medicine have attracted the interest of many capable young men.

The Association of American Medical Colleges has kept accurate and complete data on the students in our medical schools for many years and recently we have made great strides in the recording and analyzing of this data.

FIG. 21
DISTRIBUTION OF STAFF MEMBERS BY RANKS IN VARIOUS DEPARTMENTS

	Private (41 schools)				
Department	*Prof.*	*Assoc.*	*Assist.*	*Instr.*	*Total*
Anatomy	79	79	80	91	329
Biochemistry	65	59	65	40	229
Bacteriology	46½	43½	46	42½	178½
Physiology	64	45	64½	54	227½
Pharmacology	47	42	43½	44	176½
Pathology	64½	83½	97	102½	347½
Total	366	352	396	374	1488

FIRST TWO YEARS

Private
Number of Students—7150
Ratio students to faculty
4.8 to 1

Private and Public
Total faculty: 2614
Total students: 13,326
Ratio students to faculty
5.1 to 1

FIG. 22
DISTRIBUTION OF STAFF MEMBERS BY RANKS IN VARIOUS DEPARTMENTS

	Public (37 schools)				
Department	*Prof.*	*Assoc.*	*Assist.*	*Instr.*	*Total*
Anatomy	88	57	56	63	264
Biochemistry	54	44½	44	28½	171
Bacteriology	46	36	38½	31½	152
Physiology	64½	31½	43	27	166
Pharmacology	42½	32	20	18½	113
Pathology	64	51	63½	81½	260
Total	359	252	265	250	1126

FIRST TWO YEARS

Public
Number of Students—6176
Ratio students to faculty
5.5 to 1

Private and Public
Total faculty: 2614
Total students: 13,326
Ratio students to faculty
5.1 to 1

In my opinion, serious consideration should be given to keeping accurate records on the members of our staffs and to playing a greater role in helping with placement and intelligent planning for recruitment. Each one of us must consider himself a member of a Committee of the Whole to do his part to meet the challenge I have discussed with you today. In closing, I wish to pledge our Association to meet its responsibilities in this time of national emergency.

Health Legislation and the Shortage of Physicians*

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THE PRESENT SITUATION: Never before has there been such widespread interest in the availability of medical care. This interest is as evident among farmers and labor organizations as among professional groups; among business men as well as among government officials. Discussions of these problems are being accorded top billing in newspapers, popular magazines and radio programs. Polls of public opinion on this subject have been taken with increasing frequency. Programs of medical care in other countries are commanding a great deal of interest and are exerting measurable effects on public attitudes.

These problems have become political issues of the first magnitude. Starting before the war, and continuing at an accelerating rate, legislation designed to meet various aspects of the problem has been introduced at national and state levels. Many of these proposals are sweeping in character and indicate the trends in legislative opinion. This opinion, in turn, reflects the conviction among broad sections of the public that there is a shortage of physicians and an undersupply of medical service, especially in rural areas, and that more medical care should be available to more people at less cost.[1]

There have been differences of opinion regarding the size of our physician shortage, and the approach which should be taken to solve the problem. The medical schools and the American Medical Association are accused of desiring to continue this shortage by refusing to expand the number of students admitted to medical schools. These beliefs are not stilled by protestations by the profession of its interest in maintaining the standards of training and medical care, nor by its fears that the regimentation of medicine will impede its progress and lead to socialism and a welfare state. Statements that the British medical program, though better than was expected, is still not as good as the American voluntary system have not been convincing to the public. Statistics showing that the United States already has more physicians per population unit than most other countries have proven equally unconvincing.

Nor do rural people believe that better medical care, especially for the seriously ill, can be provided by transporting them to a hospital or clinic, even though this trip gives them not only the advantage of modern facilities for diagnosis and treatment but also medical service in a shorter time than usually is required to summon a local physician. Furthermore, it is difficult to persuade some patients that they get much better care by going to a physician's office with the benefit of the diagnostic instruments there than by having their pulses taken at the bedside at home.

The existence of these public beliefs, and of an increasing demand for more

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medical service, must be recognized. If these demands continue, whether they represent true needs or not, some form of health legislation will ensue.

We must plan our course accordingly. Every effort must be made to determine what are the true needs. Where needs exist, steps should be taken to meet them. Where they do not exist, the medical profession must "tell its story so clearly and understandably that no unwise action will be taken."[1]

WHAT ARE THE FACTS? Although methods for quantitatively measuring the demand for medical service are inadequate, there is general agreement that several factors have increased this demand.[2] The wide publicity given to advances in medical science in recent years and the greater needs of the higher percentage of older people have contributed to an increasing demand for service. Expansion in public health services has had a similar effect. The rapid growth of voluntary hospital and medical care insurance and of services made available through collective bargaining has expanded the demands for service. The psychologic factors also are important in increasing the demand for physicians. Just as troops have a better morale when the medical officer goes over the top with the company, even though the stretcher bearers can and do give just as effective first aid care to the wounded, so the public, especially in the country, feels more secure, assured and confident if a doctor lives in the immediate vicinity and is available for phone calls at night. However, during the daytime, the rural patient often seeks the town physician voluntarily in the usually mistaken and paradoxical belief that any doctor at a distance is better than a local one. The present superior media of communication and transportation should have reduced the patient's fears, anxieties and impatience, yet they appear to be increasing rather than decreasing.[1] In other words, is this shortage and maldistribution of physicians real or is it a problem created by changing demands, and perhaps unreasonable demands being made on the medical profession? [1]

Beginning with 1920, the farmers, consciously or unconsciously, decided that the government must share the risk of low farm prices. A little later, labor obtained legislation requiring the government and industry to share the risk and costs of unemployment, pensions and social security. Though the interests of the farmers and labor are diametrically opposed,—the former demanding high prices for farm produce and cheap manufactured goods, and the latter wanting cheap food and high wages—, they seem to have formed a successful, though informal, alliance in the hope that their contradictory aims will be attained. If this alliance continues, and, in spite of their opposing interests it probably will, some form of health legislation will be enacted by Congress in the near future.

Statements have been made that thirty million people—20 per cent of the population, particularly farmers and people of low incomes—are not getting adequate medical service.[3] It also is true that the present medical profession is busy with the remaining 80 per cent of the American population. Therefore, how can these physicians be stretched out to cover this additional 20 per cent?

WHAT CAN BE DONE? First, the medical profession, and especially the faculties of medical schools, must recognize that a serious problem exists, and that it must be met. Next, a solution to this dilemma must be sought by showing the public how its desires as well as its needs can be fulfilled without making medicine a ward of the State, or dominated or controlled by it.[3] The profession must realize that good health is the basic desire of every nationality as expressed by the American salutation of "How are you?"; the British "How do you do?"; the French "Comment allez-vous?"; the Spanish "Como esta usted?"; etc., and by the various national toasts, for example, the British "To your good health;" the French "A votre santé;" the Spanish "Salud;" etc.

The most practical and immediate solution of the problem of supplying more medical service to more people with the present number of physicians is so hard-boiled that it will not be adopted, and consists in convincing the public that the best medical care is in the physician's office or the hospital wards and outpatient clinics and not at home. Though this statement is unquestionably true, the public is difficult to convince. Were it not for the antitrust laws, physicians might agree not to make any home calls because they could see many patients, who are now not being seen, in their offices or clinics in the time occupied at present by driving to various homes, especially when these homes are scattered in the country. Modern cars and ambulances make transportation safe and comfortable even for the very ill—and the latter should be taken to hospitals anyway. After all, this is what many physicians are doing or trying to do at present, but the public does not like it and assumes that the profession is refusing home calls solely for its own convenience. There is no question but that the omission of home calls is convenient for the physician but also it is true that office, clinic and hospital visits are better for the patient.

Nothing would be accomplished by the redistribution of the present medical profession, either voluntarily or compulsorily. There are not enough physicians to provide additional medical service unless all home visits were declined, as suggested above. Actually, if a compulsory redistribution of medical care were enacted by Congress, it would increase the public's dissatisfaction with the medical profession,—and it already is considerable—, because if all of the medical profession accepted the Government program and attempted to give everyone some form of service like our present public schools, the people who now have private medical care would be forced to accept less service. Furthermore, the farmers and labor will not pay increased taxes for medical care unless they get something for their money, and without more physicians they will not get more medical service. With the present method of home calls there is not enough to go around.

MORE PHYSICIANS: The training of more physicians, especially for rural general practice,[4] seems to be the only way to provide more medical service with home visits and a wider distribution of the profession. So long as a physician can make as comfortable a living in town as in the country, he (or his wife) usually prefers to remain in town. However, if the number of

graduates is increased, the economics of a better income in the country will make them locate where they are needed. Perhaps this wider distribution of physicians which would follow an increase in the number of graduates might make compulsory health insurance and similar bills less attractive to the taxpayers.

It is true that the people of the United States have, as stated above, more physicians in proportion to the population than exists in any other nation. It also is true that we have more automobiles and tooth brushes. The American paying public, as well as the charity group, use more medical service than do other nationalities, just as they use more automobiles and tooth brushes. Every physician in practice at present is as busy as he can be, so if more service is desired, more graduates must be produced.

So far nothing much has been done about this shortage of physicians, although several Congressional bills contemplate aid to medical schools, and a three year tooling up period is mentioned in connection with the compulsory health insurance program. This latter program, for the reasons set forth above, will emphasize the need for more medical graduates,—in fact, the plan will not function unless there are more physicians.

The faculties of the medical schools must assume the leadership in facing this dilemma and recognize their responsibility for medical service as well as for medical education. All of the evidence indicates that the status quo is unsatisfactory. Unless we take the initiative in meeting the issue of increasing the amount and distribution of medical service, we may soon be placed on the defensive. There are only two questions for the medical schools to answer: (a) is there a shortage of physicians, and (b) if so, what can be done about it? As indicated above, there is a shortage of physicians, especially in rural areas, although there is some controversy as to whether 25 or 50 per cent more graduates are needed by 1960.[3, 5] We cannot say that nothing can be done about it because the public will insist even more vigorously that something must be done about this shortage.

THE SUPPLY OF PHYSICIANS can be augmented in at least three ways: (1) by increasing the enrollment in each of the present medical schools; (2) by building, equipping and staffing new medical schools, and (3) by bringing in the ill-prepared graduates of foreign schools.[6]

1.—To increase the enrollment in existing medical schools two courses are open. The schools could admit larger classes while adhering to their present schedule of instruction or they could adopt an accelerated program. At present, most schools are operating at capacity or beyond. Classes could not be enlarged without seriously threatening standards of training unless substantial additions were made to the physical plants. This would entail expenditures of large sums of money, which the schools do not have. Funds authorized for construction in pending Federal legislation are negligible when compared with the amounts of money which schools now need and would need were physical facilities to be expanded to accommodate more students. Following this course would mean a long delay in bringing about any size-

able increase in student enrollment. The present standards of medical education could be maintained, and needs could be met if preference in admission is given to carefully selected students who have intelligence and character (especially from rural areas), and if the M.D. degree is given after the completion of three medical school years of four quarters each. Thirty-two percent more physicians could be trained and the present physical facilities could be used to capacity, if the same sized classes were admitted every nine months as under the Army-Navy wartime accelerated program;[7] or if four smaller classes were admitted every three months, as at the University of Tennessee College of Medicine,[8] or two classes every six months as has been recently advocated.[9]

Although the long summer vacations would be eliminated under any of these "accelerated" plans, from four to eight weeks of holidays would still be provided. As a matter of fact, the usual long summer vacation, which European universities do not have, is now an anachronism in this country. It was started in colonial days, when our economy was entirely agricultural, in order that the students could help in the fields. This effect of agriculture on vacations is well illustrated in North Carolina, which has an entire term of school in the middle of the summer during the "lay-by season" to compensate for the early spring vacation during the tobacco and cotton planting, and the late harvest when the help of the children is needed. Furthermore, most of the colleges and universities are being operated on a twelve months basis of two semesters of four months each and a "summer school" of two to three months. Even the universities of the Ivy League, which formerly scorned these summer schools of the State universities, have now succumbed. Is it too much to expect that the medical schools will see the light and utilize their expensive plants and equipment throughout the year?

At present, there is no incentive for the medical schools to change from the three quarter to a four quarter academic year. Medical faculties, especially in the premedical sciences, as well as the students, did not like the compulsory accelerated program of the war.[10] Many of the difficulties of that plan, however, were due to the depleted teaching staffs and to the fact that many of the students were sent to the medical schools rather than being selected by them. Since its beginning in 1930, Duke has had an optional accelerated schedule, and 72 per cent of the present seniors voluntarily proceeded on the four quarter per year program and were graduated in less than four calendar years. Perhaps the financial difficulties of all medical schools, both state and privately endowed,[11] and the temporary "bonuses" for additional medical students in some of the Congressional education bills will supply the inducement to adopt the four quarter program.

The accelerated program is the most feasible and economical means of increasing the supply of physicians as, in addition to utilizing the present buildings and equipment to capacity, it would require a smaller increase in faculty, which is our greatest bottleneck (see below), than would be needed if several new schools were established. If all the schools adopted this accelerated pro-

gram, 2,000 additional physicians (32 per cent more) would be graduated annually. This increase would begin in five years, i.e. three years for the medical school course and two years for intern training.

2.—The establishment of new medical schools with the aid of State and Federal subsidies would produce from 50 to 100 new physicians annually per school. Assuming that 2,000 more doctors are needed annually, at least twenty new schools would be required. A minimum of ten million dollars would be needed for the building and equipment of each medical school and teaching hospital. Ours cost five millions in 1928, and although two million were added in the following twenty years for more space and equipment, we are still crowded and need more. Approximately one million dollars, over and above collections from patients and students, will be required annually for operating expenses.[12]

At least from ten to twelve years will elapse before many new physicians would become available from these new schools,—five years to train the faculty, three years to build, equip and organize the new school (these periods may overlap), from three to four years for the medical course (depending on whether an accelerated program is adopted) and two years for intern training.

3.—It has been suggested that if the States would let down the barriers to medical practice, the refugee physicians from European medical schools would provide the additional medical service needed. It is true that some of them are excellent,—a keen student may become a brilliant physician in spite of his mediocre medical school training[6]—, but most state boards of medical licensure find it difficult to differentiate these candidates.

The danger of expansion is that some schools, for financial reasons, may admit more students than can be taught adequately. The fruits of overcrowding can be seen in the deplorable medical schools in Germany.[6] If it is decided to increase the number of medical graduates, every effort must be made to maintain the quality of instruction on as high a level as possible. The opponents of expansion state that the standards of medical education may deteriorate if more physicians are trained. This is a definite risk because medical education is an apprenticeship, and one of the chief benefits derived by the student is the personal contact with the faculty. Certainly a class of 100 students cannot be taught as well as one of 75, and the instruction of 75 is not as satisfactory as that of 50, or of 50 as of 25, or of 25 as of one, like Mark Hopkins and the student at the other end of a bench.

But this is *reductio ad absurdum*. What is the point of maximum quantity and quality? What is the optimal number of students per class who will derive the greatest benefit for the expense involved? This number, above and below which the law of diminishing returns becomes operative, of course, will vary with the school and its financial, physical and clinical resources, but it probably is somewhere between 50 and 150 students per class, with an average of 100. However, regardless of the number of students, it behooves medical faculties to see that there is little or no deterioration in the quality of the instruction and, what is equally or more important, in the caliber of the stu-

dents selected. This country must not be exposed to an influx of ill-trained physicians. Poor medical service is more dangerous than none at all.

MORE MEDICAL TEACHERS: The greatest difficulty in the expansion of the number of physicians will be to find a sufficient number of trained medical teachers. No surplus exists today as it did in the 1920s. Then, thanks to the foresight of the Rockefeller Foundation, long term fellowships and instructorships were established at the Hopkins so that those who wished to go into academic medicine had an opportunity for training. For example, John Howland's pediatric department in the 1920s had enough money to maintain thirty fellows or instructors or associates at one time or another so that they could obtain training for several years for professional posts.[13] It was frugal living, but there was no other school in the country at which this prolonged academic training was available. Practically all of that group became professors of pediatrics in one-third of the medical schools in this country, as well as in some of those abroad. Gradually increasing medical school expenses and decreasing revenue during the 1930s and 1940s dried up those stipends.

The Welch fellowships, financed by the Rockefeller Foundation and administered by the National Research Council, and the recent Markle Scholarships in Medical Science, established by the John and Mary R. Markle Foundation, are now providing similar opportunities for prolonged training for medical academic careers but the supply is barely adequate to fill the present vacancies. Any expansion of medical faculties at present is possible only by robbing other schools.

However, there is a very hopeful sign that a reservoir of young medical teachers has been established by the U. S. Public Health Service, AEC, NRC, Cancer, Heart and Infantile Paralysis Funds, and other traineeships and research fellowships even though they are on a temporary annual basis. The hundreds of keen young men and women attending the last meetings of the American Society for Clinical Investigation, the Society for Pediatric Research and other similar groups, most of them supported by research grants, give promise of becoming the medical teachers who will be needed if medical service is to be expanded without sacrificing standards. These fellowships were not consciously designed for the training of teachers; in fact some of the fellows are not permitted to teach more than sixteen hours per year, but they are initiating young graduates into the academic field. If the State or Federal governments wish to increase the number of physicians, either by expanding the present schools or by establishing new ones, they should start now to provide long term,—at least five year—, fellowships at sufficient stipends, like the Markle Scholarships in Medical Science, in order to compete with the lure and financial rewards of private practice. In that way, these keen young men and women, now on short term research fellowships, may be recruited into medical teaching as a career.

The benefit of these fellowship programs on the recruitment of medical teachers will be chiefly in the clinical fields, since many, though by no means all, of the present fellows are engaged in clinical research. The greatest short-

age is and will be in the basic preclinical sciences. For example, in 1949, Flexner et al pointed out that only 87 candidates for appointments in anatomy were in training to fill the 107 existing vacancies, and, further, that there are now more men in the higher ranks than in each lower rank, i.e. there are 139 professors, 102 associate professors, 87 assistant professors and only 20 instructors.[14] The situation is just as acute in the other preclinical teaching fields. The pyramid is upside down.

This situation can be improved if any additional funds obtained are used to make a career in the basic sciences more inviting. Some of the great excess of medical applicants could be diverted to Ph.D. programs in the basic sciences if the attractions were increased. Another source of preclinical teachers is the graduating medical class, but it could be tapped only by a real increase in the salary budget of the preclinical departments. So long as the rewards remain much higher in the clinical departments, it is folly to expect the graduates of the medical schools to fill the preclinical vacancies.

If a large part of the proposed financial aid to medical schools is used to make teaching in the preclinical departments more attractive, there will be a stream of teachers toward the preclinical departments. Many medical educators can still recall the large number of applicants for preclinical positions during the early years of the last depression and the exodus from these departments as these positions became comparatively less attractive.[15] Financial aid to medical education should be so used that the shortage of preclinical teachers will be relieved. If not, it will result in the poorer training of physicians by overloading the instructors and causing many members of the already depleted faculties to get out of teaching.

Enlarged classes without adding to the number of trained teachers in the preclinical, as well as in the clinical, fields obviously increase the teaching load at the sacrifice of scholarly productivity. This also may cause an exodus of teachers, but it can be compensated for, partially at any rate, if it can be demonstrated that they will not suffer financially. If financial sacrifice is to be the lot of the teachers where expansion occurs, only the dregs will remain at those institutions.

Provision also should be made to keep potentially good teachers in medicine, even though they may have but little research talent. The present fellowship program is reversing the old axiom that "medical faculties are paid to teach but promoted only for research"—now these keen young graduates are paid for research and it is hoped that they will be teachers.

Another factor which would improve the recruitment of medical teachers would be to discard the present "hush-hush" method of faculty appointments and to advertise in medical and other journals that vacancies exist and that applications are welcomed, as Lippard has suggested.[16] At present, most of the graduates feel reticent about applying for a post and believe it is more fitting to wait until invited. As a result, medical education is losing many an excellent potential teacher, who, like Barkis, is "willin", if asked. British and European universities for generations have advertised for applicants for

medical posts, and, more recently, the fields of biology, philosophy and English in this country are following a somewhat similar program.[15]

SUMMARY

All the information available indicates that pressures will continue for the enactment of legislation providing: (a) for health insurance, and (b) for measures to stimulate the production of more physicians. No matter what avenue is chosen for the extension of medical service, whether tax supported or voluntary, more physicians will be required. The desirability or necessity for compulsory health insurance, either medically or politically, and the relative values and disadvantage of other approaches are not under discussion in this paper, the purpose of which is to point out that thorough and competent studies of both sides of this question[17] indicate that any Government health plan will have difficulties,[8] not the least of which is a shortage of qualified medical personnel, especially medical teachers and rural practitioners. That American medicine has changed rapidly during this generation is often forgotten.[18] Activities of health departments, which twenty years ago would have disturbed both the taxpayer and the medical profession, are accepted today as part of the American way of life. The movement toward some method of sharing the costs of illness is gaining momentum. If such legislation is enacted before provision is made for increasing materially the number of medical graduates, there will be a long delay before it will have much effect on the distribution of medical care or on the practice of medicine. For many years, it will be a dead letter, like the prohibition law, because there are not enough physicians to provide additional and more widespread medical service. The medical care of the public will be worsened if premature and unrealistic health legislation is forced by the farmers, who naturally look to Washington for anything they want, and by labor which, except possibly for the big unions like the coal miners and auto workers, who may prefer their own medical organizations, has been supporting compulsory health insurance.

CONCLUSIONS

1. Any extension of medical service should be preceded by a program to produce more physicians.
2. If the output of the present medical schools is to be expanded or new schools are to be established, the most urgent need is for more faculty. Ample long term fellowships are needed for the training of future medical faculties as no surplus supply exists at present. Greatly increased salaries, especially in the preclinical sciences, are necessary to attract and hold trained teachers.
3. Additional physicians would be available at the end of five years if the medical schools adopted an accelerated four-quarter curriculum.
4. From ten to twelve years would be required for new schools to begin to produce physicians.
5. Continued attention must be given to the problem of increasing the numbers of physicians settling in rural areas.

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A Domiciliary Medical Care Program as an Integrated Facility in the Medical Curriculum*

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INTRODUCTION

In 1948, The Commonwealth Fund of New York published the report of the Joint Committee of the Association of American Medical Colleges and the American Association of Medical Social Workers entitled "Widening Horizons in Medical Education, A Study of the Teaching of Social and Environmental Factors in Medicine."[1] Even a cursory survey of this publication impresses one with the manner of organization and presentation of the collected data and the volume of work accomplished under wartime conditions. This is admittedly an initial study of a problem that has many broad implications. The extensive bibliography included in this report is an accurate reflection of the increasing interest in the incorporation of these concepts in the medical curriculum.

The data presented as a result of this study represent but one aspect of the many complex problems inherent in medical education. The segmental arrangement of instruction, the growing volume of essential basic science information and the increasing complexity of patient management have all served to separate the student of medicine from his primary goal in life,—the understanding and care of the individual who requests his help and guidance.[2] It is at once apparent that the modern physician is a much better trained person scientifically than his predecessor. It is quite possible that this improvement has been obtained at the expense of any concerted effort to develop that breadth of understanding and quality of insight essential to the realization that the value of the physician's service depends on the nature of his relationship with the patient.

During the past two years, a specific program has been emerging at the Boston University School of Medicine directed at developing in the medical student a full comprehension of the physical, psychological and social aspects of medical care. This material is being presented as a practical answer to the problem of integrating various phases of the medical curriculum into a unified approach to the patient as a whole. The central core of this program has been the utilization of a domiciliary medical service as an undergraduate teaching facility.

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It has been the practice at the Boston University School of Medicine for the past seventy-five years to include in the curriculum an assignment on the domiciliary medical service which operates from the Out-Patient Department of the Massachusetts Memorial Hospitals.[3] This Service provides medical care to a medically indigent population residing in approximately a square mile area surrounding the Medical School and Hospital. According to the 1940 census, this district of Boston contains a population of about 50,000 and includes a wide variety of racial strains. The social, economic, environmental and medical problems in this area are numerous and varied. A large proportion of the population are on general relief, housing facilities are notoriously inadequate, chronic alcoholism is common and crime flourishes. The tuberculosis mortality rate in 1948 for the South End (about one-half of the area) was reported as 259 per 100,000.

In July, 1948, the operation of the Home Medical Service became the function of the Division of Social and Environmental Medicine of the Department of Preventive Medicine. The assumption of clinical responsibility by the Department of Preventive Medicine created an unusual opportunity to approach the concepts of preventive medicine at the level of the individual patient and his family.

With this aim as one of the major goals, a series of changes were made in order to achieve certain definite objectives. These included improved facilities and equipment, better supervision of students and the integration of the services of several departments of the Medical School and Hospital in a more comprehensive approach toward the patient.

Of primary importance is the fact that medicine is taught with the patient in his natural environment. The student not only sees the patient at home but, as a result, often has the opportunity to observe the characteristics of illness at the onset rather than the later more fully developed manifestations of disease as seen on hospital wards. He is given primary responsibility for medical care and is confronted with the varied and inclusive problems of general practice. He cannot avoid seeing the patient in relation to other members of the household and there is little need to place particular emphasis on social and environmental factors in relation to illness. This is usually only too apparent.

During the course of this assignment each student develops familiarity with the utilization of public and private resources for the provision of medical care and it is hoped that he becomes impressed with the concept of medicine as a social as well as a natural science. A very real and successful attempt is made to coordinate the special interests of Internal Medicine, Preventive Medicine, Psychiatry and the various medical and surgical specialties into a teaching facility directed at a unified approach toward the patient and his problems.[4]

Organization and Facilities

The Home Medical Service operates from the Out-Patient Department of the Massachusetts Memorial Hospitals. Calls are received from individuals

living within the area served and represent the main source of requests for medical care. Patients are also referred by social agencies and by hospitals who desire further follow-up in the home of patients who are being discharged. Calls are received by a registered nurse who makes a preliminary evaluation of the case directed at determining financial and medical eligibility. Determination of financial eligibility is admittedly cursory but is followed up later when the home visit is made. Cases in obvious need of emergency care are referred directly to the hospital and ambulatory patients are advised by the nurse to report to the Out-Patient Department. The nurse-secretary is also responsible for maintaining medical supplies, equipment and filing of patient records. In addition to these duties she meets with each group of students at the beginning of their assignment and discusses with them basic and practical procedures in home nursing. During 1949, a total of 2,876 new patients were seen by the Home Medical Service, 6,107 calls were accepted and 11,608 home visits were made.

Fourth year students are assigned to the Home Medical Service in groups of from four to six for one month. An additional month on this Service is available as an elective. The fourth year student, now officially designated as an extern, equips himself with a bag containing diagnostic material, is provided with a few simple drugs, and makes the first personal contact with the patient.

It may be of some significance to indicate the legality of this procedure. In the Commonwealth of Massachusetts a student who has completed two years of study in a legally chartered medical school and who is over 21 years of age may receive limited registration as an Assistant in Medicine and be assigned to the care and observation of persons requiring medical service by an instructor in said medical school who is a registered physician. Such registered Assistants in Medicine may practice medicine as authorized by General Laws 112, Section 9A, only under the supervision of an instructor who meets the above qualifications.

Two practicing physicians who are on the Medical Staff of the Hospital and have appointments as Assistants in the Department of Preventive Medicine serve as preceptors. They meet the group of externs each afternoon and personally check the patients seen that day. At this time, a definitive or working diagnosis is decided on and treatment instituted. The relationship between extern and preceptor is essentially that of physician and consultant in so far as the patient is concerned. The various departments of the hospital and medical school cooperate freely in providing special consultations whenever indicated. In July, 1950, the preceptors are to be replaced by two residents.

Each day's work begins with a conference with the Director of the Home Medical Service at which time all the cases seen the previous day are reviewed. This creates an opportunity to discuss problems in differential diagnosis and patient management, and provides continuity and coordination of patient follow-up. Obviously, it is essential that the Director of the Service

be an individual experienced in medical practice and qualified to assume this responsibility.

Certain laboratory and diagnostic facilities are available to externs. These include equipment for routine urinalysis and blood studies. The services of the Chest Survey Clinic at the Massachusetts Memorial Hospitals are utilized for obtaining photofluorograms of the chest when indicated. A portable electrocardiograph is available for such investigations as are indicated. The recent developments in chemotherapy and anitbiotics emphasized the need for adequate bacteriologic investigation. The facilities of the Boston Health Department are utilized for the investigation of suspected diphtheria, tuberculosis and bacterial enteric diseases. The rise in the incidence of diphtheria during 1949 created an opportunity for many externs to see and recognize clinical diphtheria for the first time in their medical school careers. It also brought to the foreground many practical problems concerned with the management of communicable disease in the home, and the control of carriers and contacts. Practical clinical bacteriology for the investigation of conditions other than those of primary concern to the Health Department has been made possible through the cooperation of the Department of Microbiology which has made facilities for bacteriologic evaluation available to externs on the Home Medical Service.

The Service maintains separate records on its patients which are always available in the alphabetical files in the conference room. The regular outpatient form is used and the records are continuous, each extern entering a clinical note on the record for each visit. As a result, each successive group of externs may be oriented quickly in regard to the medical status of patients still under observation who have been seen by previous groups. Although the first day or two may be somewhat hectic, by the end of the first week most externs behave like seasoned practitioners.

The Service supplies a certain amount of medication consisting of acteylsalicylic acid, phenobarbital, sodium bicarbonate, ephedrine sulfate and sulfadiazine. The medication is not intended for long range therapy but, rather, to tide patients over a short period of time until they can get prescriptions filled. Certain additional medication is also made available, such as mercurial diuretics and epinephrine, but is used only when specifically indicated and when patients cannot afford to purchase them. Patients on general relief may have prescriptions filled at the hospital pharmacy for which the hospital is subsequently reimbursed, in part, by the City of Boston. Through the courtesy of E. R. Squibb and Sons, a limited amount of crysticillin is supplied for use on the Home Medical Service. The Parke-Davis Company has also made available a supply of Penicillin S-R for the purpose of determining its value in the treatment of the diphtheria carrier.

Approximately 90 per cent of patients seen are treated at home. A certain number of patients are referred to the Out-Patient Department for further investigation when they become ambulatory. Hospitalization, when indicated,

is obtained either at the Massachusetts Memorial Hospitals or the Boston City Hospital.

In respect to further follow-up of patients, the positions held by members of the Department of Preventive Medicine are strategically significant. The head of the Department is also Director of the Genito-Infectious Disease Clinic of the Massachusetts Memorial Hospitals and is a member of the Staff of the Evans Memorial where he makes regular rounds on the medical wards. The Director of the Home Medical Service is Director of Out-Patient Service and a member of the Medical Staff of the Massachusetts Memorial Hospitals. He is also a member of the Medical Staff of the Boston City Hospital and makes regular rounds on the medical wards of the Boston University teaching service.

The wards of both institutions are open to externs and, as a result, no problems are encountered in following the course of patients hospitalized from the Home Medical Service. At the onset of the reorganization of this Service, ward rounds were conducted at the Boston City Hospital once weekly with the extern group. This is an obviously desirable procedure since the bulk of the patients requiring inpatient care are hospitalized in that institution. Unfortunately, the pressure of other activities has made it necessary to discontinue this service for the present. It is expected that these weekly ward rounds on hospitalized patients of the Home Medical Service will be re-instituted in the near future. The preceptors are members of the Out-Patient Medical Staffs of both the Boston City Hospital and the Massachusetts Memorial Hospitals.

From time to time, particular problems have arisen that have made special consultations desirable. These have been obtained through the cooperation of the special services of the Massachusetts Memorial Hospitals such as the Surgical, Obstetrical, Gynecological, Genito-Urinary, Ophthalmological and Dermatological Services. To the patient in the home, therefore, the resources of both the Hospital and School are available for medical care. The extern, on the other hand, finds himself in the position of a general practitioner with his instructors as consultants.

Integrated Services

1. Visiting Nursing Association

The services provided by the Visiting Nursing Association and those provided by the Home Medical Service are interdependent to a certain extent. Patients referred by other agencies and organizations for nursing care frequently require medical care as well. These patients are usually referred to the Home Medical Service. On the other hand, the Visiting Nursing Association is relied on heavily for the provision of nursing care to many of the patients seen by the Home Medical Service. The South End Visiting Nursing Service operates from the South End Health Unit which is located one-half a city block from the Medical School.

The supervisor of the Visiting Nurses meets each new group of externs

and acquaints them with the various types of service which this organization may be called on to supply. These services include nursing care for acute or short term illness as well as care for chronically ill patients. A physiotherapist is available from this group. Advice and guidance is provided in the solution of health problems such as proper dietary management. This is also one of the few services which provides home care for patients with surgical dressings.

II. Social Service Department

The teaching of the relationship of social and environmental factors to illness would be at best a sterile intellectual exercise in the absence of active participation of the Social Service Department. In dealing with a medically indigent population, the demands on public and private resources is a problem of considerable proportions. It is most desirable, therefore, that externs on the Home Medical Service be thoroughly acquainted with available sources of aid and the methods through which these sources are utilized for the benefit of their patients.

During the first week of their assignment, students have a conference with the head of the Social Service Department of the Massachusetts Memorial Hospitals. This meeting is concerned entirely with a review of the various social agencies available to handle various specific or general problems that may arise and the services which the Social Service Department itself may supply. At subsequent conferences that are held at weekly intervals, the time is devoted entirely to reports and discussions of the cases which the externs have referred to the Social Service Department for assistance. These conferences are attended by the Director of the Home Medical Service, members of the Social Service Department, the supervisor of the South End Unit of the Visiting Nursing Association and the entire group of externs.

In November, 1949, the full time services of a social worker were made available to this activity. Previous to that time, it was necessary to limit, somewhat, the number of patients that were referred to the Social Service Department which was already laboring under a heavy load. With this restriction during 1949, the Home Medical Service referred 131 patients to the Social Service Department. Many of these patients were referred because of the presence of multiple problems of social, environmental or emotional nature complicating physical illness. Some were relatively simple situations involving placement for terminal care of patients with late malignant disease, obtaining temporary financial assistance, evaluation of clinical status of patients at the request of public relief agencies and placement of children one or both of whose parents required hospitalization. Others were much more complex and were concerned with the provision of adequate care and the development of a proper family adjustment in cases of chronic illness, the association between family relationships and marital problems in illness, and the personality problems in individual patients.

In general, the desirability of including some emphasis on the relation

between social and environmental factors and disease in the medical school curriculum has been a subject of discussion for some time and has been attained by a variety of techniques from simple case studies beginning on the hospital ward and extending into the home of the patient to a frank domiciliary program directed at the total approach to the patient.

Department of Psychiatry

It is obvious that the diagnosis and treatment of specific illness, the consideration of the individual's economic status to determine if it is possible for him to finance such fundamental needs as are essential for his welfare, and the evaluation of the patient's environmental circumstances in order to alleviate, in so far as possible, those which are detrimental in nature, are all basic and essential features justifiably included in a teaching facility directed at introducing to the medical student the need for insight and understanding as an essential factor of medical practice. It would have been shortsighted, however, to have provided these facilities and to have disregarded completely the psychic and emotional components which play such an important role in health and disease. It is noteworthy, therefore, that the Department of Psychiatry is contributing a major degree of support to this program both in interest and active participation.

This Department provides a two hour conference each week for the entire group of externs. At these meetings cases are presented which externs have encountered in their daily practice. These cases are selected because of the presence of significant psychic or emotional factors and are discussed not only in regard to specific symptoms but also in regard to the association of these symptoms to family background and the problems of social interrelationships. It is interesting to note, at this point, that although the conferences conducted by the Department of Psychiatry and those dealing with problems referred to the Social Service Department were instituted essentially for the benefit of the externs of the Home Medical Service they are now attended by other interested visitors from the staff of the hospital as well as visitors from organizations outside of the hospital. It may be of interest to present two of the cases discussed at these conferences to illustrate the nature of the problems involved.

Case No. 1: An 11 year old colored boy was seen on two occasions by the Home Medical Service, once because of an uncomplicated acute upper respiratory infection and once because of a painful toe which had resulted from a traumatic episode. The extern reported that although the physical complaints were relatively minor, the home conditions were such that the patient's emotional development was seriously affected. This patient was referred to the Social Service Department and after detailed study by this organization and the extern was presented at a Psychomatic Conference.

Further investigation revealed that the patient was an illegitimate child who lived with his mother and maternal grandmother. The relationship between these two women was strained by the presence of constant friction and both found the boy a burden. The mother worked all day and, according to the grandmother, was out all night. The grandmother is an incessant talker who complained bitterly about the boy, rarely knew where he was and gave no indication of any sense of responsibility for his welfare. Both women stated that the patient "is starved for love" but seemed to feel no need to provide this affection themselves.

The boy had been a problem both at school and in the neighborhood. In school his progress had been unsatisfactory and he had been placed in a special class. It was thought that he was mentally retarded. His main difficulty at school seemed to be that he had a high "nuisance value." Much of his time was spent in fighting with other boys. In the neighborhood he was known to the probation officer and had been to court because of a charge of petty larceny.

Numerous attempts to interest the mother in developing a satisfactory program for the boy merely resulted in a series of broken appointments. Finally, the mother lost her position in the dress factory where she had worked and the patient and his grandmother gave up their home to live with a maternal aunt. The aunt and her husband were conscious of the indifferent care that the patient had been receiving. It was through them that it was possible to make arrangements to send the boy to a summer camp.

In the summer of 1949, the patient spent eight weeks at Agassiz Village.* The report stated that it was immediately apparent that here was an unhappy, insecure and "crushed" child. The summer experience was not merely one of going from city life to camping. It was acceptance after rejection, an invitation to belong after feeling out of things and being an integral part of the interesting and fascinating life to which he had come. In observing this boy, it was noted that his initial attitude of suspicion changed to incredulity and was gradually followed by relaxation, contentment and happiness. He participated in group activities, developed skills and showed evidence of intelligence and initiative. It was felt that, properly guided, he could become a useful contented and well adjusted human being. Subsequent to his return from camp, continued efforts to improve this boy's status were developed through a representative of the Newsboy's Foundation.

Comment: The benefits derived as a result of careful consideration of this boy's circumstances require no further discussion. It is unfortunate that at this point satisfactory rapport with the boy's mother has not been established. Indeed, it may be necessary and, in fact, desirable to continue working through the aunt who seems to be the only member of the family willing to cooperate in an attempt to remedy a most unsatisfactory home life and the consequent deleterious effects in so far as the patient is concerned.

CASE NO. 2: This patient is a 210 pound 57 year old white married female who was seen because of a variety of complaints, including tinnitus, alternating sensations of heat and cold, abdominal pains and distension, vertex headaches and nervousness. She gave a past history of chorea at age 9, a cholecystectomy at age 47, which was followed by the development of a large incisional hernia and she had pneumonia at 48. Her formal education ceased at age 14 when she went to work as a salesgirl. When the patient was 17, her mother died of cancer of the stomach. In the same year, she married a railroad worker who was 17 years her senior. After 14 years of childless marriage, this couple was joined by a friend of the husband who became a permanent member of the household. Sixteen years later, the patient's husband died of a cerebral hemorrhage and two weeks later, she married her husband's friend. Shortly after the second marriage, about ten years ago, the home in which this couple lived was destroyed by fire.

Her husband worked as a railroad freight handler at a salary of $30 weekly. The patient and her second husband apparently got along well together until four years ago when she began to suspect that he married her out of pity. It was at this time that they made a trip to Montana to visit her husband's family. They were obviously not well received and on returning home her husband developed the distressing habit of spending weekends on alcoholic bouts and reappearing on Monday morning somewhat worse for wear, minus his paycheck. This marked the beginning of her present illness and in the subsequent three and one-half years the patient developed a fear of leaving her home and actually did not step outdoors alone during this entire time.

This material was discussed at both the Psychosomatic and Social Service conferences. Through reassurance, continued visits and interviews by the extern several striking changes were effected. She was encouraged to come to the hospital to see the social worker about obtaining a new corset for which funds were made available, and to discuss the possibility of developing some income by selling some of her handwork at the hopsital gift shop. She made visits to the hospital unaided and did her own shopping for the first time in three and one-half years. Coincidental with these changes in the patient, her husband curtailed his drinking habits.

*A summer camp for underprivileged children.

Comment: The results obtained in this case were extremely encouraging and indicated very clearly how much can be accomplished by sympathy, understanding and the availability of minimal facilities to take care of the patient's needs.

The Family Study Program

The facilities which have been described thus far comprise the Home Medical Service with its provisions for medical care and its adaptation for undergraduate teaching. It seems apparent that an organization such as this offers a unique opportunity for the careful evaluation of what may be considered a fundamental environmental influence as it affects the patient, namely, the family unit. If it is assumed, as Sigerist[5] indicates, that the four major functions of medicine are: 1. Promotion of health. 2. Prevention of illness. 3. Restoration of the sick. 4. Rehabilitation, then, with these aims in mind, a plan of family study may provide a valuable adjunct to a well rounded medical curriculum. The increasing concern over the diminishing numbers of physicians interested in accepting the role of the family doctor is also closely allied to the considerations which are under question.

While it is true that a domiciliary type of medical training stresses the importance of avoiding consideration of the patient as an isolated and unrelated example of organic disease, a brief period of four weeks in the last year of medical school represents too sudden a shift in teaching aims to prepare the student adequately for the problems he is required to face. If the goal of the physician is to restore the patient to his position as an integrated member of society, then the necessity of the study of the patient in group relationships is at once apparent. It is equally clear that one is necessarily impelled to approach this viewpoint with the family as the basis of group relationship.[6]

In order to attain this end, a vertical study has been instituted which begins at the onset of the third year of medical school and continues through the entire third and fourth years. Each student of the third year class is assigned to a family (household unit) which has been under the care of the Home Medical Service. The families are selected with considerable care and, in so far as possible, include at least one member with a chronic illness and several young children. The physician in charge of this project interviews each member of the third year class, makes a simple and brief personality evaluation of the student and instructs him in regard to his approach to the family and the manner in which he should gather his material. The third year student is also given a brief outline to indicate the material to be included in the collection of basic family data. This outline contains five primary topics,—the family, the home and surroundings, economic status, social history and, finally, a traditional history and physical examination of each member of the family unit in addition to an evaluation of medical and social needs. This material is turned in at the termination of the preliminary work-up period and forms the basis of the family study to which subsequent current data are added.

The program at this point evolves into three specific but integrated approaches concerned with (1) the management of such acute problems that

may develop; (2) the formulation of concepts of management of specific chronic illness as well as the immunization of children and emphasis on the preventive aspects of disease, and (3) the consideration of the social, economic and environmental factors in relation to illness, problems of personality and attitudes and family interrelationships.

The acute problems are managed as a joint effort of the third year student working in conjunction with the Home Medical Service. In so far as possible, the third year student is encouraged and aided to maintain the status of family advisor. The demands of the curriculum, however, make it difficult for third year students to be available at all times. When he is not available, the call is picked up by the Home Medical Service and the third year student is notified later. A similar arrangement will be maintained during the fourth year.

On completion of the first series of interviews between the students and the supervisor of the Family Program, a second series is begun. At this time the preliminary work-ups are in the process of completion and discussions with the supervisor deal with the evaluation of observable phenomena. These interviews are concerned with the evaluation of symptoms and the organization of complaints and physical findings into a consideration of differential diagnosis. Functional complaints are approached directly from the point of view of disturbances of normal physiological balance in order to circumvent the pitfall of "psychogenic disease or symptoms of psychic origin." The data are then formulated into a general approach to the problem of long term therapy.

For a variety of reasons, including clinical immaturity of the student and lack of experience, it was thought desirable to deal with the psychosomatic or psychiatric aspects separately. It is hoped that the Department of Preventive Medicine will have a psychiatrist on its staff in the near future who, among other responsibilities, will act jointly with the internist responsible for the Family Program. The advice and services of a psychiatrist will, therefore, be available to the student after he has formulated and developed a concept of patient management based primarily on an organic approach.

Summary

An attempt has been made to present the organization and administration of a domiciliary medical care program at the Massachusetts Memorial Hospitals which is utilized as an undergraduate teaching facility in the Department of Preventive Medicine of Boston University School of Medicine. The integration of the services of several clinical departments and one preclinical department has been a particularly interesting feature in the development of this activity. The opportunity to emphasize the importance of social and environmental factors in relation to illness has broadened the scope of this department in affording a unique and practical experience in education of undergraduate medical students. Out of this experience has evolved a very real and positive approach to health which may be characterized as a dynamic balance between normal physiological body function, on the one hand, and

the response of the individual to social and environmental influences on the other. The concept of disease, then, is not limited to a categorical description but represents a disturbance of equilibrium which necessarily requires consideration of the individual not only in relation to disturbances of his internal environment but his response to external environment as well. This, in other words, is the total approach to patient care.

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Language and Science

Technology has contributed to language not merely a Hindustani typewriter with all the characters of the language, but even a Chinese electro-automatic typewriter-teletype, containing a type-face cylinder on which 5,400 Chinese type-faces are engraved, which is electrically operated by keys; thirty-six numerical keys are divided into four groups, and any Chinese character can be put into printing position by striking one key in each group. Another contribution of technology to the linguistic field is a Braille shorthand machine, enabling the blind to take rapid dictation. A third is the Filene Finlay Translator, consisting of an individual light-weight radio receiving set equipped with earphones and an aerial imbedded in the shoulder-straps, which permits the system of simultaneous translating used at the Nurnberg trials and in some of the UN proceedings. A variant of this appliance is a portable translating machine, only eighteen pounds in weight, devised by a Frenchman for business conversations among persons speaking different languages; as one person speaks, the translator gives a simultaneous translation which is the only thing heard by his interlocutor. The soundscriber, wire and tape recorder and mirrorphone have taken their place side by side with the earlier phonograph record for foreign language instruction and speech correction, and are gradually being adopted by the more progressive schools of language. It is no wonder that linguists look upon scientists and technicians as their most valuable allies, and miss no occasion to express their gratitude for the assistance they receive. (Pei, Mario: Study of Language. J. B. Lippincott Company, Philadelphia. 1950. p. 272.)

Teaching the Anatomy of the Nerve Supply of the Abdominal Digestive Tract

A Critical Summary for the Medical Student

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The following account is an approximation of what the average medical student should know about the nerve supply of the digestive tract at the end of his course in anatomy. Since the more inquiring student will wish to go far beyond the material offered here, I shall be glad to furnish a list of references on request.

This summary results from study of many investigations on the visceral nerve supply in general, most of the leads to which were obtained from reviews and monographs. Here, as in a mathematical demonstration, it is necessary to formulate precise definitions of fundamental terms, on which must depend the logical development of the subject. The visceral nerve supply is from two contraposed (not necessarily contra-acting or antagonistic) systems: (1) the sympathetic, being the thoraco-lumbar outflow from spinal nerves T 1 to L 3 inclusive, and (2) the parasympathetic, being the craniosacral outflow from cranial nerves 3, 7, 9, 10 and 11 and sacral nerves 2, 3 and 4. These two contraposed motor outflows comprise the autonomic nervous system of Langley. Of the cranial outflow only the 10th (vagus) and accessory vagus elements of the 11th are distributed to viscera of the thorax and abdomen. The extensive sensory inflow from the viscera, not considered by Langley, will be described below as components of the sympathetic and parasympathetic systems.

The sympathetic motor path (except to the suprarenal medulla) always involves a sequence of two neurons: (1) the preganglionic (pre-, i.e., before synapse) whose cell bodies invariably lie in the ventrolateral gray column of the spinal cord, and (2) the much more numerous[1] postganglionic (post-, i.e., after synapse) whose cell bodies lie either in the chain or collateral ganglia. It is apparent that the correct term for preganglionic is presynaptic and for postganglionic postsynaptic; this criticism will be found most cogent as applied to the parasympathetic system. However, long usage has so firmly entrenched the incorrect terms that it could seem pedantic and at first confusing to replace them here.

Preganglionic fibers leave the spinal cord by way of ventral roots; thence by white rami communicantes they reach the chain ganglia. These latter are also called paravertebral ganglia because they and their slender longitudinal connecting trunks (sing., truncus sympathicus) lie like strands of loosely

1. In the superior cervical ganglion of cat Billingsley and Ranson ('18) found 32 postganglionic neurons (cell bodies) to each preganglionic neuron (nerve fiber in the cephalic end of the sympathetic trunk).

threaded beads, one strand on either side of and parallel to the vertebral bodies.

Preganglionic fibers on reaching the chain ganglia have three possibilities of synapse: they, or their branches, (1) may pass straight through chain ganglia to synapse in collateral ganglia (e.g., the celiac), whence postganglionic fibers are distributed to viscera; (2) may synapse in the first chain ganglia they enter; (3) may pass up or down the sympathetic trunk to synapse in higher or lower chain ganglia. After synapses of possibilities 2 and 3, postganglionic fibers are distributed in two very diverse ways: (a) direct from chain ganglia to viscera of the thorax and abdomen; (b) from chain ganglia to spinal nerves as gray rami cummunicantes for distribution to sweat glands, pilomotor muscles and peripheral bloodvessels. Each spinal nerve of the entire series (31 on each side) receives one, sometimes more than one, gray ramus communicans. Gray rami contain a preponderance of nonmyelinated fibers (hence allegedly gray), are exclusively motor, exclusively postganglionic, and, without exception, recur to spinal nerves for peripheral distribution. All gray rami are made up of postganglionic fibers, but all postganglionic fibers do not make up gray rami; those from chain or collateral ganglia to viscera are termed not gray rami but splanchnic or visceral nerves.

Preganglionic fibers to the abdominal digestive tract emerge from spinal nerves T 5 to L 3 inclusive, passing by white rami to respective chain ganglia. But most fibers do not synapse in the chain ganglia; rather, utilizing possibility 1, they go straight through and synapse in collateral ganglia. Fibers from chain ganglia T 5 to T 12 reach their collateral ganglia by way of the greater, lesser and (if present) least splanchnic nerves; those from the chain ganglia of L 1, 2 and 3 will be discussed below. It should be emphasized that most preganglionic fibers to the digestive tract (except to distal colon and rectum) synapse with postganglionic neurons in collateral ganglia, much the largest of which is the celiac (one on either side of the celiac artery); similar but smaller and more caudal ganglia are the superior mesenteric, aortico-renal and inferior mesenteric. All collateral ganglia of the abdominal region are interconnected by a gangliated preaortic plexus; this plexus and, in vastly larger part, the collateral ganglia themselves lodge postganglionic cell bodies, which send their fibers out along the courses of arteries (periarterial plexuses) to innervate the vascular supply, the glands and the tunics of the digestive tract in its abdominal length. Similar plexuses of postganglionic fibers reach the spleen, pancreas, liver, kidneys, ureters, urinary bladder, prostate and seminal vesicles or uterus, and testes or ovaries.

Sympathetic fibers to the suprarenal medulla form dense sprays of nerves from the celiac ganglia, and these fibers are found to be preganglionic, despite the fact that they have traversed both chain and celiac ganglia. The medullary (chromaffin) cells of the suprarenal, supplied by these preganglionic fibers, produce an internal secretion (adrenine) which has a systemic effect resembling the action of sympathetic postganglionic neurons. The chromaffin

cells have arisen from sympathetic neuroblasts, and in early stages cannot be distinguished from them. In later stages, the chromaffin granules appear, these having a special affinity for chromium salts. The sympathetic origin of chromaffin cells suggests that the suprarenal medulla is essentially a massive aggregate of postganglionic neurons, adapted to a richly vascularized stroma, and putting out not postganglionic fibers but instead the hormone, adrenine, whose diffuse action by way of the blood stream is, in effect, sympathetic postganglionic.

Fibers from chain ganglia of L 1, 2 and 3 pass, in part, to spinal nerves as gray rami communicantes; in part to abdominal viscera as lumbar splanchnic nerves. Some fibers of the latter are preganglionic to collateral ganglia, such as the superior and inferior mesenteric. Many fibers of the lumbar splanchnics are postganglionic, and are directed over the pelvic brim to join other postganglionic fibers from the preaortic plexus. The nerve composite thus formed is, if a single cord, the presacral nerve (a rarity), if more than one cord, the hypogastric nerves, if as usual retiform, the hypogastric plexus. This plexus or its equivalent is the main sympathetic postganglionic supply to the pelvic colon and rectum, the other supply being the plexus on the inferior mesenteric artery. In cases of megacolon (Hirschsprung's disease) where there is marked imbalance of nerve supply in favor of the sympathetic (inhibitor) over the parasympathetic (accelerator), relief is reported following lumbar ramisection, ganglionectomy or neurectomy of hypogastric and inferior mesenteric plexuses.

The parasympathetic supply to the abdominal digestive tract is the craniosacral outflow, already noted as passing by way of the vagus and visceral branches of sacral roots 2, 3 and 4, these latter branches known as pelvic splanchnic nerves. As in the sympathetic system, the parasympathetic motor paths are characterized by a sequence of two neurons, preganglionic and postganglionic. The preganglionic cell bodies of the vagus are in the dorsal motor vagus nucleus of the medulla oblongata; those of the pelvic splanchnics are in the ventrolateral gray column of the sacral region of the spinal cord (opposite vertebral bodies T 12 and L 1). Synapses between preganglionic and postganglionic neurons, as well as the latter neurons themselves, are located in so-called terminal ganglia on, in, or near the viscera supplied. In the case of the stomach and intestine, the postganglionic neurons form diffuse nerve nets of cell bodies and fibers in the visceral tunics, one net being in the submucosa (submucous plexus of Meissner-Billroth), the other between circular and longitudinal muscle tunics (myenteric plexus of Auerbach). Whereas sympathetic preganglionic and postganglionic synapses are in chain and collateral ganglia whose postganglionic fibers are relatively long, synapses of the parasympathetic are in terminal ganglia whose postganglionic fibers are very short. The name "terminal ganglion," in the sense of a compact aggregate of cell bodies, is, obviously, not descriptive of the diffuse gangliated plexuses in the walls of the digestive tract. Though it is generally held that the cell bodies of these plexuses are functionally comparable to terminal

ganglia of the parasympathetic in cranial and other regions, the plexuses also serve as intrinsic nerve nets which have an autonomous action, perhaps demonstrated by very gradual restoration of peristalsis and secretion after central, i.e., preganglionic connections have been severed, as in vagotomy.

Functionally, the sympathetic and parasympathetic are in various ways contraposed and regulatory. As examples, the vagus is cardio-inhibitor and visceromotor (increases peristalsis); the sympathetic is cardio-accelerator and viscero-inhibitor (decreases peristalsis). The vagus dilates visceral bloodvessels, the sympathetic typically constricts them, though according to Katz both vagus and sympathetic dilate the coronary arteries. The vagus is secretory, e.g., produces active flow of digestive secretions; the sympathetic is nonsecretory, but has a trophic action which causes the laying down of secretory granules within the gland cells. The pelvic splanchnics are, like the vagus, visceromotor, vasodilator and secretory.

Where sphincters occur in the digestive tract, as at the gastric cardia, pylorus, ileocecal valve, rectal and internal anal sphincters, most of these are kept in tonic contraction by the sympathetic; White et al found the ileocecal sphincter relaxed by epinephrine (the active principle of adrenine, hence sympathetic postganglionic). The behavior of the stomach is typical: the sympathetic relaxes the stomach wall and closes the pyloric sphincter, which action accomplishes the filling mechanism. When vagus stimuli predominate, the pylorus relaxes and the stomach is emptied by increased peristalsis. This thumbnail account of the filling-emptying mechanism of the stomach, while basically sound, is, by no means, the whole sequence, which is too involved for review here.

Not only do the sympathetic and parasympathetic differ in their sources, morphologies and functions but also in their chemical mediators, which latter, following the reinvestigations of Dale and the brilliant demonstrations of Loewi, are still subjects of intensive investigations. It is known that at all synapses between preganglionic and postganglionic fibers, both of sympathetic and parasympathetic, a chemical, acetylcholine, is liberated, and is considered the chemical mediator at these synapses. Likewise at all parasympathetic postganglionic nerve endings the same chemical is liberated, its action in general being visceromotor, vasodilator and secretory. Hence the parasympathetic as a whole is now termed the cholinergic system. On the other hand, at most sympathetic postganglionic nerve endings a different chemical, adrenine, is liberated, and this is viscero-inhibitor, vasoconstrictor and nonsecretory (trophic). Hence the sympathetic is now termed the adrenergic system. The suprarenal medulla (of chromaffin cells) is the largest producer of adrenine, a hormone distributed, like others, by the bloodstream, and having a systemic action resembling sympathetic postganglionic nerve endings. *Vide supra* for reasoning that chromaffin cells are in effect sympathetic postganglionic cell bodies.

At certain types of nerve ending, e.g., those at sweat glands, the sympathetic postganglonic fibers produce not adrenine but acetylcholine. So it is apparent

that classification of the two contraposed nervous systems on the basis of their chemical mediators does not wholly conform to their anatomical classification, since the sympathetic outflow is found to have a cholinergic component. At least it can be said that adrenine is produced by many postganglionic endings of the sympathetic and is distributed as a hormone, while acetylcholine is a very widespread chemical liberated at all preganglionic to postganglionic synapses and at many postganglionic nerve endings; also it has been discovered as the transmitter of excitations at neural junctions within voluntary muscles, and is now reported as the chemical mediator within the central nervous system.

Wherever acetylcholine is produced, it is not distributed by the bloodstream, as is adrenine, but is locally and rapidly hydrolized by a powerful enzyme, cholinesterase, to form acetic acid and relatively impotent choline. But, to cite a basic experimental procedure, when cholinesterase is temporarily inhibited by physostigmine (eserine) or prostigmine, and, therefore, cannot destroy acetylcholine, the latter displays a more sustained activator property. In contrast, adrenine is less rapidly inactivated, reportedly by amine oxidase and tyrosinase. The medical student in his work in biochemistry, physiology and pharmacology will become familiar with these and other complex developments which cannot be discussed adequately here.

Summarizing functional differences between sympathetic and parasympathetic: the sympathetic often discharges both by extensive ramifications of postganglionic fibers and by way of adrenine in the bloodstream, so that all parts of the body are simultaneously affected,—the heart accelerated, erythrocytes poured into the blood stream by the spleen, bloodpressure and bloodsugar raised, blood augmented in skeletal muscle from skin and visceral areas, the pupils dilated. In brief, the body as a whole receives an emergency supply of energy for "flight or fight," resulting from rage, fear, anxiety or other emotional disturbance. In contrast, the parasympathetic is synaptically and chemically organized for local discharges, not for mass response. Its functions are those of conservation and restoration: it lowers bloodpressure, slows the heart, increases gastrointestinal movement and secretion, empties the rectum and bladder, and guards the retina by contracting the pupil. Cannon strikingly expressed these differences in the following simile: "The sympathetics are like the loud and soft pedals, modulating all the notes together; the cranial and sacral innervations are like the separate keys."

There remain further questions of vagus distribution, e.g., how far caudad does the vagus extend, and, conversely, how far craniad the pelvic splanchnics? Let it be said at once with Kuntz that "the exact extent of efferent vagus fibers to the large intestine in man is now known." The usual answer is that of Langley's classical work on experimental animals, namely, that the vagus supplies the stomach, small intestine, cecum, ascending and transverse colon, whereas the remainder of the colon and the rectum are supplied by pelvic splanchnics. This is the view expressed in most recent textbooks and in certain recent papers (e.g., Portis). From the morphologic consideration

of nerves accompanying arteries (the periarterial plexuses), it would be expected that the vagus would be distributed with the celiac and superior mesenteric arteries, the pelvic splanchnics with the inferior mesenteric artery. If so, the resulting distribution would conform to that of Langley's report. Histologic studies of Schmidt verify this: 3 weeks after vagotomy (in cats and dogs) he found degenerated subserous fibers in the ascending colon and to a less extent in the transverse colon, but none in the descending colon. But further, 3 weeks after cutting all sacral nerves, to eliminate the pelvic splanchnics, he found degenerated subserous fibers not only in the descending colon but also to a less extent in the transverse colon and to a still less extent in the ascending colon, thus supplying histologic confirmation of Carlson's experiments in which the entire colon was seen to contract on stimulation of the sacral nerves.

Opposed to the traditional view of Langley is much experimental work, in itself replete with contradictions. To me it seems that these contradictions, or many of them, could be resolved by hypothesizing, especially on the basis of Schmidt's work, that the vagus action field extends as a gradient to or toward the splenic flexure, and at the same time (in the same specimen) the pelvic splanchnic action field extends as a gradient to or toward the ileocecal junction, this large overlap of the two parasympathetic outflows being conducted in part by subserous fibers, in part by postganglionic elements, i.e., the submucous and myenteric plexuses. These plexuses, being diffuse nerve nets, also being activated by and themselves acting via chemical mediators, scarcely support the dogma of a precise point on the colon where vagus effectors cease and pelvic splanchnic effectors begin.

Another question, most pertinent to vagotomy, is the disposition of the two vagus nerves at the gastro-esophageal junction, the subject of a number of excellent studies, among them the works of Latarjet, McCrea, Mitchell, Walters and associates, Miller and Davis, Jackson, Doubilet et al. Latarjet was one of the first investigators of that period to emphasize variation in the number and disposition of abdominal vagus branches. McCrae showed that anterior (left) and posterior (right) abdominal vagi are each an admixture of cranial right and left vagus fibers, motor and sensory, the admixture occurring in the thorax caudal to the pulmonary plexuses, where the two vagus nerves commingle to form the coarse esophageal plexus. Mitchell, like Jackson, found that the anterior vagus usually divides into two categories of branches: (a) hepatic, giving off the pyloric, these traversing the lesser omentum, and (b) gastric branches that radiate to the cardia and across the fundus, but do not supply the pylorus. Walters et al dissected 100 human subjects and found single vagus trunks in 92, multiple trunks in 8; Miller and Davis, in 13 human dissections, found only 3 that they considered normal; Jackson's careful observations on 50 human dissections disclosed many varieties of anterior and posterior vagus distribution, and stressed the feasibility of transabdominal selective gastric resection to preserve the celiac branch of the posterior vagus. Mitchell found what Jackson does not mention, a celiac branch

from the anterior vagus. Doubilet et al from 32 dissections figure a wide variety of vagus cords deployed at the gastro-esophageal junction: the anterior vagus as 1 cord in 20 subjects, 2 cords in 10, 3 cords in 2; the posterior vagus as 1 cord in 20 subjects, 2 cords in 11, 3 cords in 1. Also, they found the hepatic nerve or nerves from the anterior vagus in 19 subjects, from the posterior vagus in 3, from both vagi in 3. In 7 subjects these nerves were not identified. While none of the above observations is based on adequate statistical series, they are nonetheless very important in agreeing that the textbook deployment of vagus nerves at the gastro-esophageal junction is not dependable. This is a datum of much practical moment because the effectiveness of vagotomy requires complete neurectomy of the vagus supply to the stomach.

On the vasomotor side, the well-known periarterial plexuses of visceral nerves to the digestive tract invite the assumption that here as elsewhere the sympathetic is vasoconstrictor, the parasympathetic vasodilator. Yet on this subject there is a conspicuous dearth of critical experimental evidence. Rather one must turn to the results obtained by the surgeon. Concerning the condition known as "essential hypertension" (i.e., having no demonstrable causative factor) White and Smithwick give admirable descriptions both of the type of individuals so affected and of the type of operation for their relief: "There is reason to believe that varying degrees of vasomotor response to stimuli exist in man. What may occasion a violent sympathetic discharge in one patient may occasion little or none in another. By and large, clinical evidence dictates that hypertensive patients, as a group, are hyperreactors (Hines and Brown), some exhibiting very characteristic syndromes" (page 321). One might extend this concept beyond the hypertensives to a larger group of "high strung" personalities and call the condition hyperreactor diathesis.

The operation advised by White and Smithwick is removal of the 12th rib, excision of the sympathetic trunk from T 9 to L 1, and ablation of the splanchnic nerves from midthoracic level to celiac ganglion. The operation is performed both above and below the diaphragm, and requires two stages, one side at a time. The purpose is to produce as extensive denervation of the splanchnic area as possible, and the result is precisely the dilation of this vascular bed, including not only the kidneys but also the digestive tract. From this result it is fair to say that the sympathetic is definitely vasoconstrictor to blood vessels of the digestive tract. The evidence for vacodilator action of the parasympathetic is much less conclusive. Following vagotomy some observers have remarked on the pallor of the gastric mucosa. However, on ingestion of food the pink tinge of the mucosa is restored. A remarkable circumstance, which seems to have attracted no comment, is that the operation of vagotomy is not thus far known to result in vasomotor disturbance of the digestive tract, such as would occur if the vagus were important in regulating the blood volume of the stomach and intestine. It is well to recall that the postganglionic elements of the parasympathetic, the submucous and myenteric plexuses (of whose physiology we have so little information) are still intact,

and may, for all we know, exert an autonomous regulatory action on the blood vessels of the gastro-intestinal walls.

The foregoing discussion is seen to deal only with the motor (effector) side of the visceral nerve supply. But visceral sensory fibers are present in great abundance, and it would be a grave error to ignore them, not only because they are the receptors in visceral reflex arcs but also because modern neurosurgery is often directed to their interruption for relief of visceral pain. From the entire digestive tract sensory fibers are transmitted to the spinal cord by the thoracolumbar inflow (sympathetic), whereas the craniosacral inflow (parasympathetic) transmits sensory fibers (a) by way of the vagus from stomach and much of the intestine to the medulla oblongata, and (b) by way of the pelvic splanchnics from the distal intestine to the sacral region of the spinal cord.

Visceral sensory fibers of the sympathetic pass without synapse through collateral ganglia, thence via splanchnic nerves to and through chain ganglia; thence via white rami they reach the dorsal root ganglia of spinal nerves T 5 to L 3 inclusive. Now may be given a complete definition of the white rami communicantes: they are central communications between spinal nerves and chain ganglia, and they contain preganglionic fibers whose cell bodies are always in the spinal cord plus visceral sensory fibers whose cell bodies are always in the dorsal root ganglia. Centrally directed fibers from the dorsal root ganglia enter the spinal cord, where the first sensory synapses occur. Thus, continuous sensory fibers pass without synapse from visceral areas to spinal cord, merely utilizing the collateral and chain ganglia as transit points, and, like somatic sensory fibers, having their cell bodies in the dorsal root ganglia.

The parasympathetic (craniosacral) inflow does not utilize the chain ganglia at all. Sensory like motor fibers of the abdominal right vagus pass through the celiac ganglia in large numbers (without synapse); most fibers of the abdominal left vagus do not reach these ganglia. The long vagus sensory fibers from abdominal visceral areas course without interruption to the nodose (inferior root) ganglia, which lodge sensory cell bodies, and from which centrally directed fibers pass to the vagus sensory nuclei of the medulla. Moore and Singleton have demonstrated by injecting an irritant (sodium iodide) into the abdominal visceral arteries of cats that pain fibers from the arteries pass to the central nervous system by way of the splanchnic nerves, i.e., through sympathetic ganglia to thoracic dorsal root ganglia. The prompt relief of peptic ulcer pain following vagotomy is attributed to cessation in production of the causative agent, hydrochloric acid; the vagus itself is thought not to transmit pain fibers from the digestive tract.

Pelvic splanchnics (not to be called white rami) course directly to sacral nerves 2, 3 and 4, the sensory fibers of the splanchnics having their cell bodies in dorsal root ganglia of these sacral nerves. From the root ganglia centrally directed fibers pass to the sacral region of the spinal cord.

The efficacy of caudal, peridural and spinal anesthesias of visceral and somatic areas is in no way contingent on the fact that dorsal root ganglia are

the exclusive loci of sensory cell bodies mediating receptors from these areas. Blocking of sensory fibers alone suffices.

The nerve supply of the digestive tract is comprehensively reviewed by Alvarez, that of the large intestine by Garry. These writers agree in cautioning acceptance of much experimental work on the nerve supply of the digestive tract. Garry closes his excellent review, in part, as follows (p. 127): "Modern work shows that the results obtained by nerve section and by nerve stimulation, especially by nerve stimulation, should be acepted with reserve. . . . They (the results) more likely depend on inadequate knowledge of the microscopic anatomy of the nervous outflows to the gut, and on the crudity of the experimental methods. The explanation of the experimental results waits on more accurate knowledge of the histology of the innervation of the large bowel."

Central integrations of the sympathetic and parasympathetic systems form, as it were, a hierarchy. Connecting (intercalated or internuncial) neurons at spinal cord levels complete the simplest visceral reflex arcs. Cranially are the well known integrations in the medulla oblongata for control of blood pressure, heart rate and respiration. Still more cranially are the hypothalamic nuclei, of which the lateral and posterior are sympathetic in connections, their stimulation producing massive adrenergic discharge. Midline nuclei in the tuber region and anterior nuclei integrate parasympathetic activities. Supraoptic nuclei regulate water metabolism through connections with the posterior lobe of the hypophysis, which latter and the pituitary system in general elaborate a composite of internal secretions for interhormonal and selective visceral controls (Fulton).

The cerebral cortex, being the highest area of correlation between somatic and visceral functions, mediates both motor and sensory fields. Gastrointestinal, cardiovascular and glandular activities are, at least in part, controlled at this level, which is also the area of conditioned reflexes, as well as the site of chronic cortical tensions (worry, frustration, guilt, etc.) and cortical crises (rage, fear and other compulsive phobias within rather limited associational fields). Much evidence is advanced to show that these cortical disturbances initiate such visceral responses as paroxysmal tachycardia, peptic ulcer, essential hypertension, ulcerative colitis, to name but a few familiar examples. Interrelations between cortical and diencephalic areas and the digestive tract have been variously studied. (Cushing; Watts and Fulton; Watts; Grinker; Opper and Zimmerman; Langworthy and Richter; Ingersoll and Jones.)

In presenting the visceral nerve supply to his students, the teacher of anatomy has for many years dealt with functional neuroanatomy as a means of bringing his subject to life. More recently, the advent of chemical mediators has made it necessary for him to encroach on the domain of biochemistry. This is a wholesome situation in that it tends to break down the artificial barriers of compartmentalized instruction.

Our own method of teaching the visceral nerve supply is necessarily regional and gradual. Dissection starts with the neck, where the student un-

covers samples of the two contraposed nervous systems, namely the vagus (parasympathetic) and the cervical trunk and ganglia (sympathetic). At this time he is told about the general arrangement of the chain ganglia, the white and gray rami and the concept of preganglionic and postganglionic neurons. In the next trunk dissection, that of the thorax, the cardiac, pulmonary and esophageal plexuses are demonstrated, and the sympathetic chain ganglia, communicating rami and splanchnic nerves require little dissection. The difference in course of right and left vagi is apparent. As a matter of instruction derived from much experiment, the postganglionic elements of the vagus are described as very short, lying in, on, or near the viscera supplied.

The vagus nerves are followed from the thorax through the diaphragm, the right behind, the left in front of the esophagus, to reach the fundus and cardia of the stomach. Most of the right vagus enters the celiac ganglion, part of the left may be traced through the lesser omentum to the pylorus and liver. Further dissection of the vagi is not practical. After removal of the stomach the celiac ganglia are found by tracing the greater splanchnic nerves through the diaphragm; light tugging on these locates the celiac ganglia which can then be dissected free of connective tissue. Students often remark on the large size of the ganglia and on the dense spray of nerves from each ganglion to the corresponding suprarenal gland. The preaortic plexus is usually well represented, and in favorable subjects the lesser collateral ganglia (aorticorenal, superior and inferior mesenteric) are found. The sympathetic chain and the hypogastric plexus (or nerves) are readily traced into the pelvis, but satisfactory demonstration of the pelvic splanchnics (parasympathetic) is difficult; they leave the sacral roots on either side of the rectum and soon lose their identity in the hemorrhoidal plexus. They, like the vagi, have very short postganglionic elements.

By the time the student is engaged in his pelvis dissection, often before this, he realizes that he has been exposed to much detailed information on visceral nerve supply, and feels the need to talk the matter through with his instructor. Those who come to me, as many do in dissecting groups of four, are given the foregoing summary and in the order presented here. Thus one of my first questions is: "What in terms of neurons are white rami and gray rami?" It will be noted in the above text that these are defined with almost mathematical precision. But rarely does the student arrive at such fundamental definitions himself. It is gratifying to set students straight on these and other points, and have them leave with a sense that their information is in better order.

One function of a critical summary such as this is to expose the shallow areas of our knowledge. Two of the most shallow are these: What actually do we know about the anatomy and physiology (1) of vasodilation, (2) of the submucous and myenteric plexuses? With these and many other areas defined, it is to be expected that future medical scientists (many of these now medical students) will narrow the gap in our knowledge toward a much higher degree of operational truth. But such truth will not be final. Scien-

tific truth never is. Like the increasing number of spiral nebulae revealed by greater and greater telescopes, there will always be more and more truth beyond the range of any present mirror of knowledge.

For the student disposed to think abstractly, I like to frame the following definition: Truth is that hypothesis which best explains all observed phenomena, where, in the matrix of human experience, we are well aware that all phenomena can never be observed.

The Indispensability of Language

The gigantic and ever-growing vocabulary of science and technology is largely international, as are most scientific and mathematical symbols. If a unified world tongue is ever achieved, it is likely that it will be due to the efforts of scientists and technicians who are irked by time-wasting and confusing language-differences. While awaiting that blessed event, science and technology contribute to the fast-expanding vocabularies of all living civilized tongues at a faster rate than all other fields of human endeavor put together.

Education likewise contributes to vocabulary growth, and is influenced by it. But education's greatest and noblest contribution to the cause of mutual understanding resides in its attempt to make language, in all its forms and varieties, accessible to all people. The process of education is carried on almost exclusively by means of the spoken and written word. No field of knowledge, with the possible but very doubtful exception of the pictorial and plastic arts, can be efficiently imparted save through the medium of language. In most fields of learning, the language auxiliary is paramount and indispensable. (Pei, Mario: The Study of Language. J. B. Lippincott Company, Philadelphia. 1950. p. 195.)

Medical College Admission Test*

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The Medical College Admission Test is the official test of the Association of American Medical Colleges for use with applicants to medical school. All policies with regard to the test, its content, fees charged, and method of administering and reporting are controlled by the Committee on Student Personnel Practices of the Association. Virtually all members of the Association recommend or require this test of their applicants.

Since the fall of 1948, the test has been prepared, administered, scored and reported for the Committee by Educational Testing Service of Princeton, New Jersey. While a description of the test and detailed information about it are published in a bulletin of information, available on request, the test itself is a restricted one. Copies are not for sale or otherwise available. It is administered twice each school year, in May and in November, under supervised conditions at centers established throughout the country. The test requires two periods for its administration, a morning period and an afternoon one. Applicants must register at least four weeks in advance of the test date, with Educational Testing Service at Princeton, New Jersey. A fee of $10 is charged each candidate. Results are reported only to the medical or other professional schools designated by the applicant. In addition, the undergraduate college last attended by the applicant is sent a frequency distribution of the scores of its students who took the test. The score of a specific individual, however, is not reported to other than professional schools. Scores are not reported to the applicant or his parents.

The purpose of the Medical College Admission Test is to give the medical college an independent current common index for all of its applicants. This index reflects certain established abilities and aptitudes. The test is not designed to serve as a single basis for differentiating those who will succeed in medical schools from those who will fail. It should be used in conjunction with other evidence. With the high selection now characteristic of the medical schools, the test scores will not in general show a high correlation with freshman grades. Indeed, some high scoring individuals should be rejected. There is an intrinsic established validity to the scores, as will be discussed later, and the recommended uses will be described.

DESCRIPTION OF TEST. The test is not static. It is undergoing constant study and change. New forms are prepared each year. The present description is of the test used in 1950. Changes in the type of content, it should be understood, will be made as soon as evidence is found to justify them.

* This article will be a chapter in a forthcoming volume, edited by Arthur Weider, "Contributions Toward Medical Psychology," to be published by the Ronald Press.

The test consists of four sections each of which is independently timed, scored, and reported. The first two sections provide measures indicative of general capacity for handling studies in a professional field. The first section deals with the verbal factor, a factor which is probably the most common one in scholastic aptitude tests. It is indicative of the applicant's ability to read with understanding and to comprehend the written word. The use and validity of the verbal factor are probably better established than those of any other factor.

The second score on the general scholastic aptitude test is based on understanding and interpreting quantitative material. While this factor is less of a homogeneous one than the verbal factor, it has been widely used. The scholastic aptitude tests of the College Entrance Examination Board and of the American Council on Education have been designed to yield a score in the quantitative field.

The third section of the test deals with attainment of knowledge and ability to reason in the field of social sciences. Items are taken from the fields of current history, economics, political science, and sociology. This section is designed to test the alertness of the applicant to social issues. It does not presuppose specific college courses in any of the fields covered. Applicants, however, who have not studied in colleges of the United States may find themselves at somewhat of a disadvantage in this section of the test.

The final section of the test presents a wide sampling of concepts and problems taken from the basic college courses in Biology, Chemistry and Physics. The section is designed to evaluate the grasp of the applicant of the fundamental principles of science. The content is drawn from the elementary courses in these fields, although the reasoning required may be more advanced. The individual items may overlap the various subject matter fields. No part scores are obtained. A single score is reported.

All of the tests are objective in character. Answers are recorded by the applicant on a separate answer sheet. The papers are graded by machine.

THE DEVELOPMENT OF THE TEST. The items which make up the Medical College Admission Test are developed and checked in much the same way that has now become standard practice in the development of widely used objective tests. The general areas to be covered by a specific section are defined or described. In the case of the MCAT, the Committee on Student Personnel Practices of the Association decided that four areas, which have just been described, were to be covered: verbal, quantitative, understanding modern society, and science. The item types found by experience to be the most suitable in giving reliable results, in influence on the persons taking the test, and in face validity were selected. Skilled and experienced item writers prepare the individual items. Many more than are required are prepared. These items are then given to a representative but small population of applicants. The results are analyzed for each item in turn. The most homogeneous items are retained and the others revised or rejected. Final selection is also based on the difficulty of the item. Each of the test sections, as finally

developed, contains material of proved reliability, of internal consistency, and of appropriate range of difficulty for the group to be tested.

After each administration of the test, the items are subjected to reanalysis. In each new form some experimental items are included which are not used in determining the final scores. These items are also studied. Each year a new form of the test is prepared which contains different items from those of the immediately preceding form. Some items from earlier forms may, however, be included.

The Science section of the test is reviewed by a committee of experts in the subject matter. This committee, drawn from teachers in undergraduate colleges, checks to see that the test covers the significant areas and that no advanced subject matter is included in the test.

The test, as a whole, may be regarded as a highly reliable instrument. The two subsections which are used to obtain the science score are slightly less reliable than the other sections. The reliabilities of each of the reported scores, based on a sample of 500 cases and computed by the Kuder-Richardson formula, are of the order of .90 or higher.

Table 1 gives the intercorrelations among the four reported scores, as obtained from a sample of 500 cases on Form XMC. The highest relationship is between the scores on the verbal section and on the section Understanding Modern Society. The lowest relationship is found between the scores on the verbal section and on the quantitative section, where the relationship is represented by a correlation coefficient of .48.

TABLE I.

Intercorrelations Among the Four Reported Scores Based on a sample of 500 cases of Form XMC

	Verbal	Quantitative	Science	U.M.S.	No. of Items	Time
Verbal	—	.48	.57	.79	95	60
Quantitative	.48	—	.59	.50	50	60
Science	.57	.59	—	.60	140	90
U. M. S.	.79	.50	.60	—	120	60

STANDARDIZATION. The test is now standardized on the basis of the population which takes it. Although common items are used for each successive form for the purpose of equating, the populations have been sufficiently stable so that no adjustment in score is now being made. If a group of 5,000 takes the test, the raw scores are converted by a simple linear transformation to a scale having a mean or average of 500 and a standard deviation of 100. Thus approximately two thirds of the group receive scores between 400 and 600. Scores range from 200 to 800. The changing of the scores from raw score to standard scale is somewhat similar to translating Fahrenheit temperatures to the Centigrade scale. The purpose of the transformation is to use a scale which will come to have a meaning independent both of the difficulty of the particular section of the test, and of the number of items which happen to be used in the section.

Scores are reported at the midpoint of a ten point interval, as smaller variations are not considered significant. Thus, scores from 420 to 429 inclusive are

reported as 425. All reported scores end in five. A table by which any score can be interpreted as a percentile equivalent is given on the back of each individual score report form. A score of 500, for example, exceeds the scores obtained by 50 per cent of the students. A score lower than 600 is obtained by 84 per cent of the students, while a score below 400 is obtained by only 16 per cent of the students, etc.

THE USE OF THE TEST IN ADMISSION PRACTICES. The MCAT must be considered in context, that is, as one element in the process of admission to medical school. There are, at this time, 79 medical schools in the United States. Each school now receives more applications for the freshman class than it has places. Selection must be exercised. Each medical school acts as an independent agent and selects the applicants it believes the most suitable. The medical schools differ one from another in many ways, including the method of selecting their freshman classes. In describing the use of the MCAT in the selection process and the selection process itself, some generalizations are made which may not fit any particular medical school.

Among the applicant population for almost all medical schools, are a large number of individuals believed by the school to be unfit regardless of what space they might have available. The first task of the admissions official or committee is to eliminate these individuals so that more attention can be given to the remaining and more qualified group. Some schools use a preliminary application form, and on the basis of the information gained from this form, discourage large numbers from continuing their applications. The MCAT can properly play a role here. Suppose, for example, 2,000 individuals make application to a private medical school which can admit a class of 100 freshmen. If all applicants who score below 400 on any section of the MCAT and who, in addition, average below 450 on the total test are eliminated, it is found that 500 applicants will still remain. Another method would be to eliminate all applicants whose undergraduate average is below a B and whose average score on the MCAT is below 425.

Through some such coarse screening, large numbers of the least fit applicants are eliminated from further consideration. The admissions committee can then concentrate on the remaining group, from which the final selections will be made. For each member of this group it usually has the following items of information:

1. A transcript of college work, including the courses taken and the grades received.
2. Recommendations from interested friends, from teachers or others who have known the student intimately.
3. Such biographical information as the medical school has requested.
4. The scores on the MCAT.
5. The results of an interview.
6. The results of a physical examination.

The Committee charged with the admission of students must carefully con-

sider what they are seeking in an applicant. If geographic distribution among the admitted class, for example, is desired attention must be given to the home state of the student. In some medical schools, boys from rural areas may be given some preference on the belief that such boys will more likely return to the rural areas to practice, and that such areas need physicians today. If this is the belief, then the exact location of the residence becomes important. Some medical schools may wish to increase the proportion of women in the entering class, or some may wish to decrease it. Some may wish to seek men aiming for research more than for the practice of medicine, and may assume they detect such tendencies at the entrance level. Some may wish to increase the number of students who have a clear notion of what specialty they wish to pursue. Other institutions may wish to give preference to applicants who believe that they will go into general practice. The type of students that the institution desires must, of course, be clearly understood before the next stage of the selection process is undertaken.

The selection problem then resolves itself into selecting from among the applicants fitting into a desired category, those who give the greatest promise of success. Success here means not merely completing medical school, which is a necessary but not a sufficient condition, but going forth after graduating from medical school and utilizing their education and training in the way believed by the institution to be desirable.

The particular way in which the results on the Medical College Admission Test should be used to further the selection process will depend upon many factors in the particular institution. While no general rules can be specified, a few illustrations may suggest the different ways in which the test results may be found to be of value and to contribute to the total picture an element not otherwise available.

Consider the case of an applicant from a large well established undergraduate college of known high standards. His scores on the test are Verbal 645, Quantitative 675, Understanding Modern Society 545, and Science 605. These scores are all high ones. His undergraduate record is uniformly superior and covers a somewhat broader program than many others of the applicants have. His recommendations, from persons who are known, are superior. In the interview he is judged to be a stable person of mature outlook. He is clearly acceptable. The test scores, in this case, add only confirmation to already known facts. He is a sound prospect.

Another common type is the reverse of the illustration just reviewed. This student scores 345 on the Verbal, 325 on the Quantitative, 345 on Understanding Modern Society, and 305 on the Science. His scores are all low. He comes from a small college of unknown standards. His transcript shows mediocre grades throughout, with heavy specialization in the science subjects. His letters of recommendation from a minister and the dean of men are laudatory, and the one from the Biology teacher is good, but judging from some things not said, it suggests that the student may not be too strong. The results of the interview indicate a poorly motivated individual of mediocre ability. This applicant

should clearly be rejected as unsuited. The test, in this case again, merely confirms other evidence.

Most cases will require more consideration. Consider an applicant whose test scores are 675 on the Verbal, 535 on the Quantitative, 585 on Understanding Modern Society, and 415 on Science. The undergraduate record from a small but well known college of average standards shows high grades in English, History, and certain social science subjects. Only the minimum requirements in science have been met, and the grades are of the C level. This college has an excellent adviser for premedical students. His confidential letter of recommendation suggests that a good deal of parental pressure is being placed on this boy to interest him in going into medicine. The adviser questions whether this is the best field for him. The boy is undecided and swayed by parental pressure. The other letters of recommendation are high. Two men interviewed the applicant and while one was rather favorably impressed, the other was not. The variation in test scores indicates that further investigation is desirable. The very low Science score, and the fact that the quantitative aptitude seems to be materially lower than the verbal aptitude, suggests that the individual may not be as well balanced in the science field as is desirable for a student going into medicine. The test results definitely suggest that before this applicant is accepted, he should be checked more thoroughly. In this case, the committee, after further investigation, rejected this applicant.

John Smith is known to be a very hard working and conscientious student. The letters of recommendation and the information sent by his adviser all stress the fact that he is systematic and extremely hard working, with almost no time out for play. His grades in his undergraduate years are uniformly high. He attended a medium sized college of somewhat above average standards. He participated in no out of classroom activities. All of his test scores are low, varying from 375 to 415. The interviewers judge him to be a serious but tense and nervous individual, of narrow outlook but well motivated and ambitious. The test scores were taken to be a definite warning that this individual was working considerably beyond his capacity. The problem that the admissions committee considered was whether he could continue to work beyond capacity and handle the heavy and long program of medical studies without breaking under the strain. In spite of his excellent undergraduate record, he was not considered to be a good prospect for the medical school to which he applied. He was rejected.

When the admissions committee at the medical school to which Bill Jones had applied looked at his test record they were inclined to admit him at once. His lowest score was 675, and his highest score 785. They were sure he was a person of high ability. A cautious member of the committee suggested that they review the entire record. It was found that although he had attended a college of high standards, his grades were only of the C average, with a few D grades offset by a similar number of B's. His recommendations all stressed the fact that he was a brilliant boy. His adviser, however, pointed out that although brilliant, he had been quite lazy and had put forth little effort in his under-

graduate work. He had not participated in any outside-of-school activities and he had been in trouble a number of times because of not doing required work or submitting the work late. The interview report suggested that he was supercilious and contemptuous of college work. He was not well read or skilled in any field, so far as the interviewer could determine. He was certain that he could take medical school in his stride. No course had proved too difficult for him in the past. The test scores were taken as a warning sign, when considered in conjunction with his low performance in college. There is no reason to believe that he will change his character upon entrance to medical school. His lazy characteristics will probably continue. In spite of his high scores the committee, after a great deal of discussion, decided on a split vote to reject him in favor of a less brilliant but better adjusted applicant.

These illustrations suggest ways in which the Medical College Admission Test results may be used. In many cases the test results will merely confirm judgments made on the basis of other evidence. In other cases, where the test results are out of line with the other information, further investigation is needed. As a result of this investigation, the student may be accepted or rejected, but the test scores have served as a warning signal.

If the MCAT results are used in this way, the scores of the class finally admitted will not necessarily show a close correlation with freshman grades. The fact that the simple correlation is low does not signify that the test has not been material help in selecting an appropriate student body.

FUTURE NEEDS. While the MCAT measures well established aptitudes and attainments and thus serves a useful purpose in supplying common information about all applicants, there are needs for other types of dependable measures. Work is now underway on measures of emotional maturity and of basic motivation. These areas are difficult ones even when the measures are based on lengthy individual testing work. The difficulties are even greater when group measures which can be used on a mass basis in a relatively small amount of time are desired. The difficulties of developing measures in these areas are intensified when the measures must be used in the pressure situation which is characteristic of the medical school admission. The interest test, taken by the applicant who wishes to find out what his interest pattern is differs materially from the interest test when taken by a student who is attempting to convince an admissions committee that he has a basic interest in medicine. It is these difficult areas, however, where new developments are expected and where the need for information is the greatest.

Modification of Cooperative Plan for Appointment of Interns

Certain minor but important changes in the Cooperative Plan for Appointment of Interns designed to improve the operation of the Plan for 1950-1951 have recently been approved and adopted by the various hospital associations, the Association of American Medical Colleges and other agencies concerned with internships. It should be emphasized that these changes do not alter the essential features of the Plan and that ample time is available to acquaint all concerned about them and make the changes.

To state these changes clearly, the entire plan is given below, with the new material in italics. They can be compared with the original statement of the Plan sent out some time ago. Additional mimeographed copies will be sent to all hospitals from the Committee on Internships and Residencies in the near future.

COOPERATIVE PLAN FOR APPOINTMENT OF INTERNS 1950-1951

Approved at Meeting of

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

Colorado Springs, Colorado, November 7-9, 1949

(As Modified)

1. Applicants may visit hospitals and be interviewed by the Intern Committee at any time, but the hospital or its representative shall not commit or bind the hospital or the applicant before the third Tuesday of February (20th), 1951.

2. Application should be made in duplicate; the original to be forwarded to the Dean of the applicant's medical school for transmission, together with credentials, to the hospital or hospitals of the applicant's choice; the second copy to be mailed directly to the hospital or hospitals by the applicant as soon as he or she has filed the original with the Dean, *any time prior to December 19, 1950.*

3. Applications filed with the Dean shall be forwarded by the Dean to the Hospital with credentials on the third Tuesday in December, 1950.

4. The applications may be accompanied by letters of recommendation from faculty members which, however, will not precede the sending of credentials by the Dean.

5. Schools of Medicine shall not limit the number of applications filed by any individual.

6. The tendering of internship appointments by hospitals shall be made by telegram.

Telegrams will be filed by the hospitals after 9:00 a.m., E.S.T. (8:00 a.m., C.S.T.; 7:00 a.m., M.S.T.; 6:00 a.m., P.S.T.) on the third Tuesday in February (February 20, 1951) for delivery or release at, but not before, 3:00 p.m., E.S.T. 2:00 p.m., C.S.T.; 1:00 p.m., M.S.T.; 12:00 noon, P.S.T.) of that day, telegrams to be addressed to the applicants.

7. Hospitals may notify alternates of their status at the same time.

8. *Hospitals and/or students shall not follow telegrams of offers of appointment with telephone calls until after 9:00 a.m., E.S.T. (8:00 a.m., C.S.T.; 7:00 a.m., M.S.T.; 6:00 a.m., P.S.T.) February 21st except for acceptance of an appointment by a student.*

9. Acceptance of appointments should be made promptly. Applicants should be allowed a reasonable period of time to consider appointment offers.

10. On acceptance of an appointment, prompt notification of withdrawal of applications to other hospitals which have offered appointments must be made by the applicant. Notice of such withdrawals may be sent by collect telegram.

11. *This plan applies only to the appointment of graduates of the current year.*

At a later date Hospitals and others concerned will be informed regarding details of a plan for the mechanical matching of applications and positions, to be carried out on a trial basis this year. *Such a plan will not affect in any way the operation of the current Cooperative Plan.*

The General Education Fanfare

The term "general education" is probably a fortunate coinage as a replacement for the older term "liberal arts education". The liberal arts are not immediately recognizable among the uninitiated in our modern society, and are probably too frequently confused with the fine arts, so that a liberal education is thought of among the uneducated, or the not-yet-educated, as an education for artists. The meaning of general education is far more immediately obvious. (Richards, Irving T.: Bull. A. Am. Colls., 36:386, 1950.)

A Proposal for Supplementing the Cooperative Plan for Appointment of Interns

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As reported in the JOURNAL OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES in May, 1945, an agreement in internship placement was reached which led to the adoption of the Cooperative Plan which has been in effect since that time.

Previous to the adoption of this Cooperative Plan by the Association of American Medical Colleges, the American Hospital Association, the American Protestant Hospital Association, the American Catholic Hospital Association and the American Medical Association, there had been much confusion due to the competing scramble for interns, with some hospitals reportedly signing up interns still in the sophomore year of medical school. This period was made extra chaotic by the demands of the war and the differences in the accelerated program at various schools.

While there seems to be a fairly widespread feeling that the Cooperative Plan is working better each year, there is still considerable dissatisfaction with the Plan in many specific instances, and there is unnecessary complication to the smooth working of the Plan under the method adopted in the final step of the Plan for the actual coming to terms by the hospitals and applicants.

Under the present conditions there are about 9,300 approved internship places in about 780 hospitals. These internships vary from 1 to 135 per hospital, with the great frequency for hospitals offering six and eight internships. There were approximately 6,000 students, completing the senior year of medical school last June to fill these 9,300 approved internships. Even taking into account two year internships and the use of displaced physicians and other means of filling them, more than 2,700 internships are not filled each year.

One must recognize that as long as there are so many more approved internships than there are students, there will continue to be disappointments both on the part of the students and particularly on the part of the hospitals in trying to fill their available approved places. It is only when the figure of approved places and the number of available applicants for these places approach each other more closely than they do now that there will be general satisfaction with any system of distribution.

Even with the many more places available than students to fill them, most students apply to several hospitals for an internship. Some Eastern schools have reported that on the average the students in their graduating classes receive three or even four offers per student for internships from the hospitals to which they apply. This means that the hospital must wait until these students make a choice and, in turn, must keep other students in suspense as to whether a place will be available for them.

As long as both hospitals and students have to go through the last minute rush of not knowing whether places will be available or will be filled, there will be instances of pressure and unfairness and consequent disappointment in the selection procedure.

The most frequently voiced objections to the present Cooperative Plan are the following:

(1) Notice by telegram. There has been in the past much confusion on this, and considerable differences in the policy adopted in local telegraph offices. Even when telegrams are filed early, the offices cannot really release them all at once and the distribution often gives much unfairness and inequality with considerable uncertainty as to whether the student will be notified on a given deadline. Many hospitals have resorted to phoning the students directly and putting pressure on students to make immediate decisions over the phone. The time differential from coast to coast has caused considerable difficulty. Release at the same local time gives some students more time for consideration than others. Even though this factor would be compensated for completely by simultaneous release over the country, regardless of the differences in local time, there is still the problem of notification and of meeting a specified deadline and often forcing a decision by the students before time for consideration or before they have received all of their potential offers.

(2) Students sometimes get panicky and accept poor internships way down on their lists because they have not heard from those of a higher position on their order of preference. Subsequently when the student gets a belated offer from what he considers a better internship, he is dissatisfied that he had not heard of this opportunity before he had already committed himself to a lower choice.

(3) Dissatisfaction on the part of students because they were not notified of their status by a number of hospitals to which they applied. Hospitals also have been put to extra trouble because students have not always immediately withdrawn their names from consideration when they have accepted elsewhere.

(4) Students have resented pressure for immediate decisions put on them by phone communication from hospitals. Some hospitals have felt that other hospitals have violated the principles of the Cooperative Plan and have notified the students early or have put undue pressure on students for immediate decisions.

It is hoped that the present proposal will eliminate all these major objections to the current plan by insuring a fair principle of distribution so that each hospital will be more likely to secure the interns it considers most desirable and each medical student will more likely receive the best appointment open to him in accordance with his expressed preference.

It should be made clear that under the proposed modification of the Cooperative Plan hospitals and students would still be completely free in making contacts and getting information about each other and in expressing their choice in selection of places and applicants. The proposal calls for the establishment of a central clearing agency to act only as a mechanical facilitation in the final step in the final process of intern selection, and would involve the

assignment of interns to hospitals only when both the hospitals and the intern had expressed a desire to have a given student selected for a given place.

The present proposal involves the establishment of a central clearing agency under the direction of a committee whose membership includes representatives of the Association of American Medical Colleges and the various cooperating hospital associations, such as the American Hospital Association, the American Protestant Hospital Association and the Catholic Hospital Association, and also a representative for the governmental agencies offering internships and a representative of the Council on Medical Education and Hospitals of the American Medical Association, and such other members as may be deemed desirable by this group.

Mr. John Stalnaker, the Director of Studies of the Association of American Medical Colleges, has given assurance that the Association office now has mechanical equipment and punch card systems which would enable it to handle this problem and act as the central clearing agency.

The following procedures would apply in the matching process by the central clearing agency:

PROCEDURE

1.—On a specified date, each student will send to a central office a rank order list of the hospitals to which he has applied, expressing his preferences in sequence.

2.—Each hospital to which at least one student has applied will be sent, from this central office, an alphabetical list of the students who have applied to that hospital. This list will not in any way indicate the student's preference but will merely be for the use of the hospital, which, at a specified later date, will return to this central office its rating of all applicants who have applied for internships.

3.—Each student should have a later deadline date after submitting his first list which would allow him to make any changes in his preference sequence, but not to add new hospitals to his list. This is particularly important if there is a vacation period between the time of submission of first lists and the actual time of notification of applicants of acceptances.

4.—Each hospital will be asked to express its choice by assigning each applicant to one of the following groups:

(1) most desirable (the number of such designations not to exceed the number of available places)

(2) desirable (the number of such designations not to exceed twice the number of available places)

(3) acceptable

(4) acceptable *only* if all other applicants are exhausted and vacancies remain

(5) not acceptable

5.—Each student would be given his preference insofar as is possible. As long as places are available, he would be assigned to the hospital of his highest choice which listed him high in its rating.

6.—Hospitals would be given a choice by allowing each one to get its pick of the students who rank it in any given order of preference so long as there are applicants and places left.

7.—The student is assigned to the hospital highest on his preference list in relation to how the hospitals rank him as an applicant.

8.—The hospital is assigned interns in accordance with its classification of applicants in relation to how the students rank it in expressing their choice.

9.—The Committee would notify hospitals of the students placed with them and students would be notified of their placement in a given hospital internship.

10.—Lists of applicants unassigned and places remaining unfilled could be sent to the hospitals and to the medical schools for individual negotiation immediately after the first matching.

The proposed modification of the Plan could be financed on considerably less than the total spent on telegrams and phone calls in contacting applicants under the present system. It is suggested that each hospital would contribute to the operating expenses of the plan five dollars for each intern which it actually receives for the first twenty interns, and three dollars per intern for each intern it receives beyond that number.

The following table illustrates the case involving thirteen students (M through Y), each of whom rated four hospitals (A, B, C and D) in that order of preference. Assuming that there were three internships at each hospital and that the hospital rated the students as indicated by the number giving its preference according to the rating scale given above. This number appears in the table opposite the hospital and under the student.

THIRTEEN STUDENTS—RATED BY HOSPITALS AS INDICATED

Hospital	*All students list these hospitals in rank order, A to D*												
	STUDENT												
	M	N	O	P	Q	R	S	T	U	V	W	X	Y
A	**1**	**1**	**1**	2	2	2	3	3	4	4	5	5	5
B	1	1	2	**1**	**2**	3	**2**	3	3	4	4	5	5
C	1	2	1	1	2	**2**	2	**3**	**3**	3	4	4	5
D	1	1	3	2	2	1	2	2	3	**2**	**3**	**4**	5

The assignments would be made of the student to the hospital as designated by boldface figures under the student's name and opposite the hospital. In general, the better students and the better hospitals are more likely to get their first choices. The procedure is set up to try to get a free choice for the student and to eliminate pressure factors and yet at the same time act as a protection to the hospital.

Where there is a decision of assignment as in the case of assignment of Students T, U and V in the above table for the two places remaining available in Hospital C after previously assigning Student R to that hospital (since the hospital rated Student R higher than Students T, U or V), the assignment would have to be made on the basis of chance, if there were more students who rated the hospital in the same order of preference and who were rated by the hospital in the same group than there were places still available.

It is obvious from this table that Students M, N and O should be assigned to Hospital A, assuming that that fills the quota, and then the hospital and those students will be eliminated from further consideration. It is also obvious that Student Y is not desired by any of these hospitals and cannot be assigned to any of them.

The table above does not cover all the possibilities, but is merely offered to illustrate some of the points of distribution. Where first choices cannot be granted, shifting and assignment will have to take place on the following principles:

(1) Any rearrangement that will improve the assignment to a hospital from the applicant's standpoint but not worsen it from the point of view of the hospital, and

(2) Anything that will improve the selection from the hospital's point of view without worsening it from the applicant's should be adopted.

Either one of the following suggested cycles for distribution might be adopted in the matching process. Assignment would then be made as indicated according to the plan adopted.

A				B			
HOSPITAL RATING	STUDENT RANKING	HOSPITAL RATING	STUDENT RANKING	HOSPITAL RATING	STUDENT RANKING	HOSPITAL RATING	STUDENT RANKING
1	1	1	4	1	1	2	4
2	1	2	4	2	1	3	3
1	2	1	5	1	2	3	4
2	2	2	5	2	2	1	5
1	3	1	6	3	1	2	5
2	3	2	5	3	2	1	6
3	1	3	4	1	3	2	6
3	2	3	5	2	3	3	5
3	3	3	6	1	4	3	6
		etc.				etc.	

Under either Plan A or B, where the hospital places the student in its first group and the student ranks the hospital first, he will be assigned to that hospital. Matchings will follow on down as indicated in the two plans, where B gives somewhat greater weight to the student's choice.

After all assignments had been made on the basis of rankings by hospitals in the first three categories, then those students still left unassigned who were ranked by the hospital in the fourth category could be assigned to the hospital so ranking them on their preference list.

Somewhat similar matching plans have been in successful operation in Canada and in local areas in this country for some time, and many large universities have used such a system in relationship to fraternity pledging and other such situations involving matching of choices by two groups in effecting a fair selection.

It should be emphasized again that this plan is designed to allow maximum freedom for both students and hospitals in the selection of interns. It would be impossible, as well as undesirable, to set up a central office with legal authority to assign interns to hospitals. It is not at all within the compass of this plan to force such developments. It should be perfectly clear, however,

that the plan can work effectively only under conditions of complete agreement and cooperation among all hospitals and all students. If it is adopted, there would be a moral commitment on the part of the hospitals and the students to abide by the matching process, and not engage in individual negotiations or arrangements for an offer of a place before the selection under the plan. It should be stated again that this plan will not in any way relieve the difficulties caused by the great excess of approved internships over available graduating medical students.

At a conference on the Cooperative Plan for the Appointment of Interns held under the auspices of the Committee of Internships and Residencies of the Association of American Medical Colleges September 13, 1950, this plan was presented to the Committee and representatives of the American Hospital Association, American Protestant Hospital Association, the Catholic Hospital Association, Council of Medical Education and Hospitals of American Medical Association, Offices of the Surgeon General of the United States Air Force, the Surgeon General of the Army, Research and Education Division of the Veterans Administration, United States Public Health Service, and Bureau of Medicine and Surgery, Department of the Navy. The minutes of this meeting, presented by Dr. John B. Youmans, Chairman, are in part as follows:

"A mechanical method for matching would be used and the Association of American Medical Colleges was represented as being equipped and willing to act as the agency. As was pointed out, the plan would not affect the principles of the existing plan, the time of submitting applications or notice of appointment but would simplify the confused and difficult process of bringing together hospital and student in order of their respective preferences. It would lessen the pressure for decisions, the usual scramble of competition and greatly reduce the costs to the hospitals.

After discussion of the plan it was proposed that its adoption for the year 1951-1952 be recommended. In the discussion which followed, however, it became apparent that many of those present felt that to attempt to add this feature without further preparation or consideration would endanger the present generally successful operation of the plan. The desirability of a trial run could be had by a voluntary operation of the plan concomitant with the operation of the present plan. This would provide an indication of the results to be expected, comparison of the present plan and experience with the proposed plan, without affecting the present plan. A motion recommending that such a trial based on the plan presented by Dr. Mullin be implemented was made and carried unanimously."

At the annual meeting of the Association of American Medical Colleges in October, 1950, this plan was discussed and it was voted to make a trial run for the present year without influencing the procedures already in effect. Finances were supplied by the Association of American Medical Colleges to carry out this trial run so that there will be no cost to the hospitals or students. A committee is being set up with representatives from the various groups concerned, and it is hoped that there will be full cooperation on the part of all students and hospitals, with the realization that this will not in any way affect selections actually made this year.

For the trial or dry run this year points 9 and 10 of the procedure indicated in the proposal above will not be followed, but hospital and medical school deans will be notified at a later date as to how the distribution would have come out if the proposal had been in effect in the actual placing of interns. Unless all hospitals and students cooperate, however, the trial will be of little value.

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Financing Medical Education

There has been a decided increase in the cost of medical education, and although tuition rates have been advanced, the relative amount that the future doctor pays toward the cost of his professional education has decreased to the point where it is being paid for largely by others. The report of the Council on Medical Education and Hospitals of the American Medical Association indicated that for the year 1949-1950 tuition supplied only 22.8 per cent of the cost of medical education. More than three quarters of the cost of his medical education was given to the prospective physician free of charge. In the state universities, the excess of cost of instruction over tuition is taken from the taxpayer's pocket. The private schools, whose revenues derive from endowment income, voluntary gifts and operational income have found it utterly impossible to make ends meet. Some of the finest private medical schools in the country are virtually bankrupt, and one or two are in imminent danger of closing. Those who are trying to raise funds from lay sources to rescue medical education are confronted with a somewhat awkward contrast between the relative prosperity of the profession and the poverty of the schools that provided them with their earning power.

Why, it may be asked, should not the doctor pay for his own education in toto? Although tuition costs are at a maximum level in most medical schools, might it not be possible to defer payment of some, and perhaps most, of the tuition until the period of earnings is high? In that way, might not full tuition costs be recovered finally by the schools? The *New England Journal of Medicine* (Ed. Aug. 17, 1950) makes this suggestion:

"What more appropriate contribution could the life insurance companies of the land make to the health of the country and to their own self-interest than to underwrite a revolving loan fund to make medical education pay its own way? Loans could be protected by life insurance policies, and interest rates kept low until the educational period was over. Such loans could be discounted and paid over to the universities immediately. From the point of view of the recipient, the repayment of the loan would probably be deductible from income tax as an expense of professional education. If the organized medical profession, as represented by the American Medical Association, is going to continue to oppose federal aid to medical education, is it willing to accept the financial responsibility of the individual physician for his own education? If so, some such scheme of long term financing might solve the dilemma in keeping with the traditions of the system of free enterprise. In fact, even governmental financing under such terms might be acceptable."

It is interesting that one medical school has evolved a plan to solve the problem of financing. The plan is not yet in operation. It entails having students pay the full cost of his medical education—additional cost, over and above tuition charges—to be evidenced by notes payable in installments over a period of 12½ years, commencing 6 years after the date he receives the Degree of Doctor of Medicine.

The plan includes escape clauses for rebating in the case of death or withdrawal, and making certain concessions for those graduates who are practicing medicine in specified localities for 12½ years or any part thereof. These localities can be designated as rural practitioner areas. Concessions will also be made for teaching, research, or serving in a government capacity, either local or national.

A preliminary report on the financial status and the needs of medical schools, which is based on a study by the Surgeon

General's Committee on Medical School Grants and Finances, has recently been made available to deans and finance officers of medical schools and others concerned with medical education. The report includes data on the income, expenses, and current needs for additional staff and facilities of the 72 medical schools and 7 schools of basic science in the United States. It is one section of the full report, to be published later this year, which will include a section on the effect of Public Health Service grants to medical schools and another section on the Committee's conclusions and recommendations.

The study was conducted in close cooperation with the Committee on the Survey of Medical Education of the American Medical Association and the Association of American Medical Colleges. The Surgeon General's Committee was appointed on the recommendation of the National Advisory Health Council and is under chairmanship of Dr. Lowell J. Reed, Vice President of Johns Hopkins University.

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The Lake Placid Meeting

The sixty-first annual meeting of the Association of American Medical Colleges was held at the Lake Placid Club, New York, October 23-25, 1950.

The attendance was large. All the medical schools in the United States, except one (Alabama) were represented by one or more delegates. Including others present, the total registration was about 350, not including the ladies. Four of the Canadian schools were represented. The interest in these meeting is growing year by year which can safely be considered a recognition of the importance of the Association in the field of medical education and other fields with which it has a strong contact.

The program was received well. The various round tables covered many aspects of medical education and were a complete success. True, some thought that there were too many round tables but the field to be covered is so large and the time in which this coverage must be made is so short that it is not possible to gain the approval of such a program by all in attendance. The good that comes out of these meetings warrants the setup. The reports submitted by committees gave excellent coverage of the subjects covered. They elicited much discussion which is fully indicative of the interest aroused by them.

The following officers were elected for 1950-1951: President, A. C. Bachmeyer, University of Chicago; president-elect, George Packer Berry, Harvard University; vice president, Edward L. Turner, University of Washington; secretary, Dean F. Smiley; treasurer, John B. Youmans, Vanderbilt University. Executive Council: Joseph C. Hinsey, chairman, Cornell; Walter A. Bloedorn, George Washington University; C. N. H. Long, Yale University. Holdovers: Ward Darley, Colorado; Vernon C. Lippard. The president, president-elect and the vice president are also members of the Council.

The place for holding the 1951 meeting will be selected later by the Executive Council. Many of those present seemed to favor a meeting on the West Coast. Announcement of the choice will be made in the near future. If the usual custom as to time of holding the meeting is followed, the date will be October 29, 30 and 31.

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Medical Education

On the recommendation of the Editorial Board, it was voted to change the name of the JOURNAL from the Journal of the Association of American Medical Colleges beginning with the January, 1951, issue to "Medical Education." The table of contents will be moved to one of the inside pages. These changes are in keeping with the practice that has been followed by medical and other journals during the past several years, i.e., using a name that is significant and descriptive of the contents and the field covered.

The Editorial Board also made other suggestions touching on the contents of the Journal which were also accepted by the Association. What these changes will be must remain for future disclosure after a final decision has been reached. The Editorial Board will take an active part in the conduct of the Journal.

One item stressed by the Board was that of College News. It was the consensus that member colleges should take a more active part in this department. Quite a number of colleges do not send any news items. Therefore, the editor has been forced to seek other sources from which authentic news can be drawn. Sometimes there is a feeling that what happens in a college is not of interest to other colleges. But it is. The appointment of new faculty members of professorial rank, full time members, changes in procedure, new buildings, new activities—everything, in short, which is always a topic of conversation when medical educators get together. Then, too, the Journal can be an excellent medium for reporting vacancies in teaching staffs. Asking individuals for suggestions is rarely a satisfactory method for filling a vacancy. If the matter were brought to the attention of the nearly 5,000 readers of the Journal it would reach a vast pool of possible helpers for solving this problem. There are so many ways in which the Journal can give help. Therefore, the Editorial Board recommends strongly that every administrative officer and reader of the Journal take a keen interest in making the Journal the best possible medium for the dissemination of every bit of information bearing on medical education and teaching.

This suggestion also applies to submitting papers for publication and helping to secure papers or publication. Too often a paper which should have been published in the Journal, if it was to reach those most interested in the subject discussed, appears in some publication which, perhaps, only a few of the regular readers of the Journal see. Sometimes, it has been possible to secure permission to republish the article but that method of securing material is neither reliable nor desirable.

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Physicians Entering on General Practice

Student polls taken by the Council on Medical Education and Hospitals of the American Medical Association over a period of the last three academic years indicate that the percentage of students planning to enter general practice has increased from 36 per cent to 47 per cent, and that the number planning to specialize has decreased from 36 per cent to 31 per cent. During the academic year 1949-1950, 31 classes in 19 medical schools were polled by their schools to determine the students' plans with respect to practice. The overall averages for the students in the 31 classes were as follows: 47 per cent planned to enter general practices and 31 per cent to specialize; 22 per cent were undecided. Forty-two schools have programs specifically designed to stimulate the interest of students in careers in general practices. Thirteen schools report the establishment of preceptorships with practicing physicians as regular assignments in the medical school course, nine having established them within the last two years. Fifteen schools are sponsoring in their affiliated hospitals internships specifically designed for prospective general practitioners. Twelve schools are sponsoring residencies in their affiliated hospitals for prospective general practioners. Several other schools have similar programs under consideration.

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Medical Education in the United States and Canada

The September 9, 1950, issue of the *Journal of the American Medical Association* publishes the annual report on medical education prepared by the Council on Medical Education and Hospitals of the American Medical Association.

This report, which covers the academic year, July 1, 1949 to June 30, 1950, is the fiftieth annual presentation of information and statistics on medical education in the United States and Canada compiled by the Council. It covers a large field. In addition to reporting the customary statistics concerning medical schools, students and graduates, many subjects of current interest and importance are discussed. These include the effect of the national emergency on medical education, a review of major developments in the medical schools during the past year and the survey of medical education. Statistics and information are also presented on the number of unfilled faculty positions reported by the medical schools, the minimum and average

cost to students attending medical school, the plans of Medical students for future practice, the establishment of preceptorships with practicing physicians, the sponsorship of internships and residencies for prospective general practitioners by medical schools, the financial support of medical education and plans for the establishment of new medical schools. The report also includes a summary of the post graduate and continuation courses offered during the past year. It is futile to endeavor to present a summary of the information given in this report. It must be read in toto to be appreciated. The Council deserves the highest commendation for its work. No other report available covers the ground covered by this report.

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Survey on Medical Education

The survey of Medical education that is being conducted under the sponsorship of the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association has visited twenty-four medical schools thus far.

During the past year an Advisory Council composed of leading citizens represented many fields of activity was created to review the program for the survey and to advise the committee as to whether the survey is developing the kind of information that the members of the advisory council believe to be needed and whether the methods used in carrying out the survey and in presenting its findings are the most effective that can be employed.

The members of the Advisory Council are:

RAYMOND B. ALLEN, President, University of Washington; DR. DONALD B. ARMSTRONG, Vice President, Metropolitan Life Insurance Company; DETLEV W. BRONK, President, Johns Hopkins University; GEORGE BUGBEE, Executive Director, American Hospital Association; WILLIAM B. GIVEN, JR. President, American Brake Shoe Company; CLINTON S. GOLDEN, Labor Adviser to the Economic Cooperation Administrator; PAUL R. HAWLEY, Executive Director, American Colleges of Surgeons; J. S. JONES, Executive Secretary, Minnesota Farm Bureau Federation; THE HONORABLE LISTER HILL, U. S. Senator from Alabama; Washington, D. C.; STANLEY RESOR, President, J. Walter Thompson Company; EDWARD L. RYERSON, Chairman of the Board, Inland Steel Company; LEONARD A. SCHEELE, Surgeon General U. S., U. S. Public Health Service; HAROLD E. STASSEN, President, University of Pennsylvania; ROBERT L. STEARNS, President, University of Colorado.

Another important development has been the appointment of the subcommittee on preprofessional education. This group will make an intensive study of the education of premedical students in all colleges and universities. The personnel of this committee is the following:

AURA SEVERINGHAUS, Associate Dean College of Physicians and Surgeons, Columbia University; GEORGE PACKER BERRY, Dean Harvard Medical School; HARRY J. CARMAN, Columbia College, Columbia University; MERLE C. COULTER, Professor of Botany, University of Chicago, Division of Biological Sciences; ALAN WILLARD BROWN, President Hobart College; WILLIAM E. CADBURY, JR. Professor of Chemistry, Haverford College; THEODORE M. GREENE, Professor of Philosophy, Yale University; FRANK R. KILLE, Professor of Zoology, Carleton College; FRANKLIN D. MURPHY, Dean University of Kansas, School of Medicine; JOHN ROMANO, Professor of Psychiatry, University of Rochester.

The work of the subcommittee is being financed by a grant of $65,000 from the John R. and Mary Markle Foundation.

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The Borden Award

The Borden Award for 1950, on the recommendation of the Committee and the unanimous consent of the Association, was given to Dr. Gerty T. Cori, professor of biological chemistry, Washington University School of Medicine. The 1948 award went to Dr. Vincent du Vigneaud, professor of biological chemistry, Cornell University Medical College. Dr. George N. Papanicolaou, professor of anatomy, Cornell University Medical College, received the 1949 award.

College News

University of Kansas School of Medicine

The school has received a gift of $75,000 from Mrs. J. R. Battenfeld, to be used for the construction of an auditorium at the medical center to be known as the J. R. Battenfeld Jr. Auditorium in memory of a son, Lieut. Jesse Raymond Battenfeld Jr., who was killed in 1945 in a military plane accident.

Promotions: Drs. William H. Algie, Robert E. Bolinger and Harry L. Douglas to assistant professors of medicine; Drs. Max S. Allen, Lee H. Leger and Sloan J. Wilson to associate professors of medicine; Dr. Mahlon H. Delp, professor of medicine; Dr. Leroy Goodman, assistant professor of obstetrics and gynecology; Dr. Donald N. Medearis, associate professor in pediatrics; Dwight J. Mulford, Ph.D., associate professor of biochemistry, and Dr. David W. Robinson, associate professor of surgery oncology.

A foundation has made a grant for a ten year period to provide for the administration and teaching of an expanded postgraduate program on a regional basis.

An immediate grant of $150,000 by the foundation was matched by an equal sum raised locally from business and industrial leaders and by the Endowment Association of the University of Kansas for the building of a continuation center or a PG student building. The continuation center will provide living quarters, a dining room, and administration offices for visiting doctors.

This program will include the following:

1. Expansion of the circuit course program to include other states.

2. Expansion of the refresher courses and addition of more of these 3 to 5 day courses at the Medical Center.

3. A regional integration of certain existing hospital facilities for teaching purposes.

4. A demonstration program in nursing, including setting up a model curriculum.

The object of the grant is to improve the quality of medicine in the whole region and to provide educational opportunities for anyone in the several state region who desire it.

The fourth annual Peter T. Bohan lecture will be given November 10, by Dr. Herman L. Kretchmer of Chicago.

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University of Texas Medical Branch

Ground has been broken for the new $1,500,000 Laboratory Building. It will accommodate a new library, and reading room, the Department of the History of Medicine, and laboratories for biochemistry and nutrition, physiology, bacteriology, parasitology and pharmacology. The building is expected to be completed in the spring of 1952.

The Postgraduate Division, announces four postgraduate courses on medical preparedness for atomic warfare. These will be held on December 15 and 16, 1950, in Corpus Christi, Texas; January 12 and 13, 1951, at Tyler; February 2 and 3, 1951, at El Paso, and February 16 and 17, 1951, at Lubbock. A preliminary session will be held from the Galveston, Houston, Beaumont area in November, 1950. The course will include material on organization for medical preparedness, principles of handling and sorting casualties, field dressing, diagnosis and treatment of burns, traumatic injuries, and radiation sickness, and the collection and preservation of necessary supplies. Speakers will be drawn from the staff of the Medical Branch, and will include experts in the biological effects of radiation and surgical specialties in the treatment of burns and traumatic injury.

In order to coordinate research studies on medical aspects of radioactive material, a special committee has been appointed composed of Dr. T. G. Blocker, Jr., pro-

fessor of plastic surgery, chairman, Dr. F. M. Townsend, associate professor of pathology, Dr. E. J. Poth, professor of surgery, Dr. Kennth McConnell, Director of the Laboratory of Medical Physics, and Dr. William Levin, associate professor of internal medicine and Director of the Hematology Research Laboratory. This committee will assist in the administration of grants for research on radioactive substances and will aid in the promotion of seminars and meetings to consider recent developments in radiobiology and medicine.

Dr. John W. Middleton, Director of the Student Health Service and of the Chest Clinic, has been promoted to associate professor of internal medicine. Dr. Middleton will be the Director of the new Ziegler Memorial Tuberculosis Hospital to be erected under the bequest of the late Mrs. Rosa Ziegler of Galveston. The hospital is designed to accommodate sixty tuberculosis patients, and will include clinic and research facilities.

Special arrangements have been made with the Texas Academy of General Practice for assignment of fourth-year medical students to qualified general practitioners for three months of preceptorial work.

Appointments: Etta McDonald, Ph.D. assistant professor of bacteriology and parasitology; Dr. Richard McDonald, assistant professor of pathology; Pauline Heizer, Ph.D., research associate in the Tissue Culture Laboratory, and Frank B. Engley, Jr., Ph.D., assistant professor of bacteriology and parasitology. A special committee on skin metabolism and regeneration has been established for the purpose of correlating studies in these fields with particular reference to the management of burns and radiation injury. The chairman of the committee is Dr. Clarence S. Livingood, professor of dermatology and syphilology, and members include Dr. T. G. Blocker, Jr., professor of plastic and maxillo-facial surgery, C. M. Pomerat, Ph.D., Director of the Tissue Culture Laboratory, Kenneth McConnell, Ph.D., Director of the Laboratory of Medical Physics and Dr. Arild Hansen, professor of pediatrics.

W. L. Moody, Jr., Galveston banker, has given $1,000 to establish a special research fund in anesthesia under the direction of Dr. Harvey C. Slocum, professor of anesthesiology.

Grants totaling approximately $50,000 have been made by the U. S. Public Health Service for the support of research. These grants include $4,600 for studies on immunity to filarial infection under the direction of J. Allen Scott, Ph.D., professor of preventative medicine; $24,600 for clinical cancer research under the direction of Dr. Frank M. Townsend of pathology; $5,300 for a study of the role of the pancreas in peptic ulcer formation under the direction of Dr. Edgar J. Poth, professor of surgery and Director of the Surgery Research Laboratory; $7,100 for a study of the effects of temperature on chlorination of sewage under the direction of C. H. Connell, Ph.D., associate professor of preventative medicine and sanitation; $5,200 for a study of factors influencing the susceptibility of mosquitoes to malarial parasites under the direction of Don W. Micks, Ph.D., assistant professor of preventative medicine, and $8,700 for research on enzymatic patterns in growth and differention under the direction of Dr. W. W. Nowinski, association professor of neurochemistry.

Dr. J. R. Ewalt, professor of neuropsychiatry, has been appointed dean of the Postgraduate School of Medicine. Dr. T. G. Blocker, Jr., professor of the plastic and maxillo facial surgery, has been appointed administrator of Hospitals to succeed Dr. Ewalt.

Dr. Eduardo Braun-Menedez, professor of physiology in the University of Buenos Aires, gave a series of lectures, October 10-15, on cardiovascular and renal studies.

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University of North Carolina School of Medicine

Appointments: Dr. Thomas C. Butler, formerly associate professor of pharmacology and experimental therapeutics at the Johns Hopkins University Shcool of Medicine, has been appointed professor and Head of the department of pharmacology; J. Logan Irvin and Carl E. Anderson, associate professors of biological

chemistry; John E. Wilson, assistant professor of biological chemistry; George P. Manire, assistant professor of bacteriology; Jack H. Brown, as assistant professor of physiology.

Considerable progress has been made in the development of the new State University Medical Center; the 400 bed general hospital, begun in October 1949, is one-third completed; contracts for a nurses' instructional building and dormintory, the intern and resident staff building, a 100 bed tuberculosis unit, a wing to the present Medical Building, and a cancer research floor to the outpatient and clinic building (made possible by a grant of $200,000 from the U. S. Public Health Service) will be let before the end of 1950. Dr. Robert R. Cadmus recently Assistant Director of the University Hospitals in Cleveland became Director of the University Hospitals on September 1st.

Post Graduate medical courses for practicing physicians in North Carolina, sponsored by the School of Medicine and the Extension Division and given at various towns over the State, are being continued this year. Speakers for two courses arranged for the fall include Dr. Louis A. M. Krause of the University of Maryland, Dr. Milton L. McCall of Jefferson Medical College, Dr. Eugene B. Ferris and Dr. A. A. Weech of the University of Cincinnati, Dr. H. Houston Merritt of Columbia University College of Physicians and Surgeons, Dr. Bentley P. Colcock of the Lahey Clinic, Dr. E. T. Bell of the University of Minnesota, Dr. Eugene Stead of Duke University, and Dr. Harold D. Green of the Bowman Gray School of Medicine.

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New York University-Bellevue Medical Center

Following 20 years of teaching orthopedic surgery, Dr. Arthur Krida has been appointed professor emeritus, New York University Post-Graduate Medical School, a unit of the New York University-Bellevue Medical Center. After completing 35 years of teaching, Dr. Walter T. Dannreuther will retire as professor and chairman of the department of obstetrics and gynecology of the New York University Post-Graduate Medical School, a unit of the New York University-Bellevue Medican Center. Dr. Dannreuther will be appointed professor emeritus of obstetrics and gynecology at the close of the current academic year and will continue all his other professional activities.

Dr. Donald Mainland has been appointed professor of preventive medicine in charge of medical statistics at New York University College of Medicine. Dr. Mainland joins the College faculty from his post as professor of anatomy at the Faculty of Medicine of Dalhousie University, Halifax, Nova Scotia.

Dr. James E. McCormack has been appointed associate dean of the Post-Graduate Medical School of the New York University-Bellevue Medical Center. Dr. McCormack has served with the Department of Defense in D.C., as executive director of the Committee on Medical Sciences of the Research and Development Board. Earlier he was assistant dean of the New York University College of Medicine for two years.

The department of preventive medicine has received a grant of $10,000 from the Association for the Aid of Crippled Children to continue studies of children with rheumatic fever and heart disease.

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Medical College of Georgia

Dr. Harry B. O'Rear, Durham, N. C., has been named professor and head of pediatrics. He will fill the vacancy created by the death of Dr. Claude M. Burpee in 1944.

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University of Illinois College of Medicine

A Virus Laboratory unit has been established for the purpose of training virologists and maintaining a full program of research. Several investigations already have been undertaken, with the support of the U. S. Public Health Service, the University's Graduate College, and Eli Lilly and Company. Current research studies involve influenza and mumps. Under the direction of Dr. John E. Kempf, an inves-

tigation is being conducted to study the virus etiology of certain skin disease by the use of the electron microscope. With the establishment of the Virus Laboratory unit, the Department of Bacteriology plans to take a major position in the training of virologists for the anticipated demands for teachers and research workers.

Three Chicago firms have awarded grants totaling $8,900 to the College in support of reseach studies. The grants are as follows: Armour and Company, $3,600, in support of an investigation of the eosinophile producing factor in the liver to be conducted by Dr. Robert M. Mark. Consolidated Cosmetics, Chicago, Illinois, $3,300, in support of a study of the mode of action of a substance used to destroy hair. This investigation is being directed by Dr. Adolph Rostenberg, Jr., in the Department of Dermatology. Abbott Laboratories, $2,000, representing a renewal of a grant in support of the study of dietary therapy in liver disease. This investigation also is being conducted by Dr. Mark.

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University of Minnesota
Medical School

A continuation course in child psychiatry for pediatricians and physicians will be presented November 27 to December 1. Dr. Ralph D. Rabinovitch and Dr. John Waterman will participate as lecturers and group discussion leaders. Dr. Reynold A. Jensen, head of the Child Psychiatry Service of the University of Minnesota, is in charge of the arrangements for the course and will also act as lecturer and group discussion leader.

Dr. Knut Lindblom of the Karolinska institute in Stockholm, Sweden, will give the annual Leo G. Rigler lecture in radiology, November 2. Dr. Lindblom will speak on "Backache", the lecture will be given in connection with a course in neuroradiology October 30 through November 3.

A continuation course in poliomyelitis will be offered November 9 to 11. Dr. Harry A. Sofield, professor of bone and joint surgery, Northwestern University Medical School will be the visiting faculty member for the course.

University of South Dakota
School of Medical Sciences

Dr. Harry J. Clausen has joined the department of anatomy as associate professor. Dr. Clausen was formerly with the School of Medicine at the University of Arkansas. Dr. W. L. Hard of the department of anatomy has received a grant of $5,000 from the U. S. Public Health Service to continue a research program dealing with certain histochemical studies on nerve and associated tissues. Mr. Larry Savage, B.A., and Nancy Phelps, B.A., have been appointed as research associates under the terms of the grant.

Dr. Charles D. Hendley, formerly assistant professor of physiology at Ohio State University School of Medicine, has accepted the position of associate professor pharmacology, pathology and bacteriology.

The South Dakota Cancer Society has given $2,000 to continue work on phytopharmacological actions of cancerous blood. Dr. Donald Slaughter, professor of pharmacology and Dr. John Winters, professor of botany are in charge of this work.

Construction has begun on the $600,000 medical science building.

Ione Rhymer, formerly of the University of Illinois, has been appointed assistant professor of microbiology.

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University of Tennessee
College of Medicine

Appointments: Dr. George W. Changus and Dr. Robert H. Pennell Jr., assistant professors of pathology. Dr. John L. Wood, associate professor of chemistry, has been advanced to professor. The School of Biological Sciences comprises the divisions of anatomy, chemistry, physiology, pharmacology, pathology and bacteriology.

The Memphis Chapter of the American Heart Association has awarded $1,000 to the department of medicine and $900 to the pediatrics department. The grant to the department of medicine will be used to purchase equipment to improve the facilities for teaching in cardiovascular disease; for aiding the diagnosis and treatment of patients at John Gaston Hospital, and to continue the research projects in cardiovascular disease. The department of

pediatrics contemplates the expansion of its clinic at John Gaston Hospital for children with heart ailments.

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Woman's Medical College

The Medical Women's International Association held its Sixth Congress, September 10 to 16, in Philadelphia, with the Woman's Medical College acting as host. Attending the Congress were two hundred women representing eighteen countries besides the United States. The general Rapporteurs on the subject of "Anemia in Women" were Drs. S. Lamotte-Barrillon of Paris and Pearl B. Holly of Washington; on the subject of "Pathology and Hygiene of Housework" were Drs. M. T. Cassassa of Turin, Italy, and Gerta Seidelin of Copenhagen, Denmark. September 13 was designated as "America Day" with the Opening Exercises of the One Hundred and First Year of the Woman's Medical Colleges as the chief event.. Dr. A. Charlotte Ruys of Amsterdam, President of the Congress, was the guest speaker.

The Convocation Dinner held at the Warwick Hotel, Philadelphia, was addressed by Captain Charles F. Behrens, the Director, Atomic Defense Division, Bureau of Medicine and Surgery of the Navy Department and Medical Officer in Command of the Naval Research Institute, National Medical Center in Bethesda, Maryland. Captain Behrens spoke on "Medical Aspects of the Atomic Age."

The final Convocation ceremony was held in Irvine Auditorium of the University of Pennsylvania on October 14 at eleven o'clock. More than seventy-five Colleges and Societies were represented in academic procession. Dr. Louise Pearce, President of the Woman's Medical College, presided.

The Convocation Address was given by Dr. Willard Cole Rappleye, Dean, College of Physicians and Surgeons and Vice-President of Columbia University. His subject was "The Physician in Modern Society."

Honorary Degrees were conferred on Dr. Alice Hamilton, Doctor of Public Health; Dr. Elise L'Esperance, Doctor of Science; Dr. Florence Seibert, Doctor of Science; Dr. Florence Rena Sabin, Doctor of Science; Dr. Willard Cole Rappleye, Doctor of Medical Sciences; Dr. Detlev Wulf Bronk, Doctor of Medical Sciences; Dr. Katherine McBride, Doctor of Science; Dr. Marion Fay, Doctor of Science.

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University of Buffalo School of Medicine

Dr. Walter T. Zimdahl has been appointed medical director of the Chronic Disease Research Institute. Miss Thelma H. Kenyon has been appointed administrator (superintendent) of the University of Buffalo's Clinic Disease Research Institute. The institute, formerly the U. S. Marine Hospital, is being organized by the University as an agency for medical and health research for the benefit of mankind. The Alcoholic Clinic now is fully set up in the hospital. The other two departments, research in chronic disease and a physical rehibilitation center, now are in process of formulation.

Dr. Stockton Kimball, dean, will give one half of his time for the next year to the Survey on Medical Education.

Dr. Roswell K. Brown has been appointed assistant dean.

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Washington University School of Medicine

A division of psychosomatic medicine has been set up under the direction of Dr. George Saslow, associate professor of psychiatry. The new unit will be supported by an educational grant of $165,000 from the Commonwealth Fund, to extend over a five year period. The departments of internal medicine, psychiatry, psychology and social work will furnish the personnel. The staff will be made up of three physicians, a cultural anthropologist, a social worker and a clinical psychologist. The division will award general fellowships to interested doctors.

Dr. Edw. W. Dempsey, associate professor of anatomy, Harvard Medical School, has been appointed professor and head of the department of anatomy at Washington. He succeeds Dr. E. V. Cowdry who will devote his clinic to the directorship of a cancer research laboratory established with

a bequest of $450,000 from Mrs. Emma Jorgenson Wernse.

The American Cancer Society has given the school a grant of $39,000 for the continuation of a program of cancer teaching and research in the school for the year through August 31, 1951 and represents support of a program which has been in operation and financed by support of the American Cancer Society at the university since Sept. 1, 1948. In addition to the institutional grant, Washington University is the recipient of grants-in-aid to the amount of $36,992 and fellowships totaling $5,800, bringing the total amount of financial assistance of the American Cancer Society to Washington this year to $81,792.

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Saint Louis University
School of Medicine

St. Louis has begun a series of seminars to be conducted in various parts of Missouri to apprise physicians of some of the cardiac problems which they may encounter in their profession.

The program is financed by a grant from the U. S. Public Health Service to the state of Missouri under the direction of Dr. Buford Hamilton, director of the Missouri State Division of Health, matched by the University.

The meetings have been arranged by the Missouri State Medical Association and will be held in the Councilor Districts of the Association throughout Missouri.

Dr. C. Rollins Henlon is now director of the department of surgery on a full time basis succeeding Dr. John W. Stewart who took the late Dr. Wm. T. Coughlin's place.

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Chicago Medical School

Appointments: Dr. Russell O. Hanson, instructor in pharmacology and physiology; Dr. Gordon Cherwitz, instructor in pediatrics.

Faculty promotions: Dr. David Cohen, to professor of dermatology; Dr. Donald H. Atlas, to associate professor of medicine; Dr. Irving Siegel, to associate professor of obstetrics; Dr. Morris Goldenberg, to assistant professor of pathology; Dr. Paul H. Kopper, to assistant professor of microbiology and public health; Dr. David B. Radner and Dr. Meyer J. Steinberg, to assistant professors of medicine; Dr. Kurt Stern, assistant professor of pathology.

A grant of $4,500 from the National Institute of Mental Health will be used by Dr. George C. Clark, associate professor of neuroanatomy, for research study for the determination of the extent of variation in the cell size and arrangement of selected portions of the brain.

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University of Virginia
Department of Medicine

Construction has been started on an addition, which will provide additional laboratory space for the departments of biochemistry, pharmacology, physiology, pathology, microbiology, internal medicine and surgery as well as new classrooms and an auditorium to seat 240. The total project, including equipment, will cost about $950,000. Construction of a unit for cancer teaching and research, costing about $250,000, is also under way.

Appointments: Dr. Joseph F. A. McManus, formerly assistant professor of pathology at the Medical College of Alabama, has joined the faculty as associate professor of pathology; Dr. Albert A. Fisk, biochemistry. Grover C. Pitts, Ph.D., has been appointed assistant professor of Pasadena, Calif., as assistant professor of physiology.

Promotions: Dr. William N. Thornton Jr., professor and chairman of the department of obstetrics and gynecology. Dr. Oliver B. Bobbitt Jr., to assistant professor of clinical pathology.

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University of Nebraska
College of Medicine

Appointments: Dr. Lester Dahlberg Odell, professor and Chairman of the Department of Obstetrics and Gynecology; Dr. Ralph Liukart, associate professor of the Department of Obstetrics and Gynecology. Drs. William L. Rumbolz and Walter T. Cotton, instructors in the Department and Dr. Leland J. Olson, clinical assistant in the department.

Wayne University
College of Medicine

The department of bacteriology and clinical pathology has been recognized with clinical pathology being incorporated in the department of pathology and bacteriology having been expanded into a department of microbiology with an adequate undergraduate curriculum and facilities for graduate study and research. Fred L. Rights, Ph.D. has been appointed professor of microbiology and chairman of the department.

Dr. Rudolph J. Noer, professor of surgery, has been appointed assistant dean. Dr. Wm. G. McCulloch has been appointed assistant professor of microbiology; Dr. Harold D. Priddle, professional associate in obstetrics gynecology.

Dr. James T. Cheng, former professor at Shanghai University, will teach at Wayne during the current year under the terms of a fellowship fund provided by the Detroit Tuberculosis Sanatorium.

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George Washington University
School of Medicine

Promotions: Three associate professors to professors of their departments: Dr. Thomas M. Peery, pathology; Dr. William W. Stanbro, radiology, and Dr. Charles S. Wise, physical medicine. Dr. Charles S. Coakley has been named associate professor of anesthesiology; Dr. William S. McCune, an associate clinical professor of surgery, and Dr. George Nordinger, an associate clinical professor of obstetrics and gynecology.

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Bowman Gray
School of Medicine

Dr. Harold W. Tribble has been appointed president of Wake Forest College, of which Bowman Gray is the medical school, to succeed Dr. Thurman W. Kitchin, retired.

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University of California
Medical Center

Dr. Milton J. Chatton, instructor in medicine, has been appointed medical director of the outpatient department. Dr. Chatton succeeds Dr. William E. Carter.

Emory University
School of Medicine

About $35,000 in medical research grants were received from the U. S. Public Health Service. The two largest Georgia grants go to Dr. John L. Patterson, assistant professor of physiology, and Dr. Albert Heyman, assistant professor of medicine, for studies on disease of the brain, and to Dr. Walter H. Sheldon, chairman of the department of pathology, and Dr. Heyman for studies on the Herxheimer reaction in syphillis. Dr. Stephen W. Gray, associate professor of anatomy, will conduct research in effect of high gravitational environment on cell and tissue growth. Dr. Paul B. Beeson, associate dean of the school of Medicine, will do research in leptospiral meningitis.

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Loyola University,
Stritch School of Medicine

Construction has started on several cancer research facilities made possible by a $47,000 grant from the U. S. Public Health Service; a radio-isotope cancer laboratory equipped with high radioactivity; an airconditioned, temperature controlled animal room; a protein enzyme laboratory for the chemistry department; a low level radioactive research laboratory for use by the physiology department; and a 250-volt deep X-ray therapy unit. A complete lead lined therapy radiation room for study of radiation on animals and animal tissue will be an adjunct of the X-ray therapy unit.

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Northwestern University
Medical College

Dr. Hiroshi Moriya, staff member of the First National Hospital in Tokyo will study hospital administration at Northwestern under the sponsorship of the U. S. Public Health Service.

Dr. Lester Nalefski has been named medical director of the Montgomery Ward Clinic. He will supervise clinical work by senior medical students and direct administration of the clinic under supervision of Dean Richard H. Young and medical school department heads.

University of Colorado
Department of Medicine

Appointments: Dr. Archibald R. Buchanan, assistant dean, Dr. Raymond R. Lanier, professor and head of the department of radiology, Dr. Cosmo G. Mackenzie, professor and head of the department of biochemistry, and Dr. J. Cotter Hirschberg, director of the Mental Hygiene Clinic.

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New York Post-Graduate
Medical School

Dr. Frode Jensen has been appointed assistant dean of this school which is a unit of the New York-Bellevue Medical Center. Dr. Jensen formerly was director of graduate and postgraduate education and associate professor of medicine at Colorado.

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University of Louisville
School of Medicine

During the summer months third and fourth year students were employed in some of the county health units in the state. This plan, inaugurated last summer, was found to help both the units and the students.

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University of Wisconsin
Medical School

A postgraduate course in cardiology will be given November 28-30 under the direction of Dr. Herman Shapiro, chairman of the department of cardiology. The fee for the course is $10.00.

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Duke University
School of Medicine

Dr. Charles R. Stephen, who has been appointed associate professor of anesthesiology. He will also be in charge of the Division of Anesthesiology at Duke Hospital.

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University of Cincinnati
College of Medicine

Appointment: Dr. James G. Wilson, of the University of Rochester School of Medicine, associate professor of anatomy.

University of Michigan
Medical School

Promotions: To associate professors in their respective departments: Dr. Alexander Barry, Ph.D., anatomy; Dr. Robert C. Bassett, surgery in the division of neurosurgery; Dr. Robert W. Buxton, surgery, and Dr. Joseph P. Chandler, Ph.D., and Raymond L. Garner, Ph.D., biologic chemistry.

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Tulane University of Louisiana
School of Medicine

Appointments: Robert B. Watson, assistant professor of biostatistics in the department of tropical medicine and hygiene; Dr. Harold Baer, assistant professor of bacteriology.

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University of British Columbia
Faculty of Medicine

D. Harold Copp, Ph.D., assistant professor of physiology in the University of California Medical School, has accepted the position as head of the department of physiology.

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Medical College of the
State of South Carolina

Retired: Dr. George M. Mood, professor of bacteriology and preventive medicine; Dr. John F. Townsend, professor of ophthalmology, rhinology and otolaryngology; Dr. Daniel L. Maguire, clinical professor of surgery.

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University of California
Medical School at Los Angeles

Dr. John M. Adams, associate professor of pediatrics at the University of Minnesota Medical School, has been named chairman of the department of pediatrics. Classes will not begin until 1952, but Dr. Adams will assume his duties this fall.

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New York Medical College

Mr. Roger Crowell Gay, assistant dean, has resigned to accept the presidency of Nasson College, Springfield, Maine.

General News

Markle Foundation Grants

Grants of over $800,000 were appropriated by the John and Mary R. Markle Foundation during the past academic year to medical schools and other educational institutions. Of this sum, $500,000 was given to medical colleges in the United States and Canada to help young faculty members become established in academic medicine, as part of a five-year program to build up the teaching and research staffs of the schools. Twenty medical schools received grants of $25,000 each for this purpose, including Columbia University College of Physicians and Surgeons, McGill University Faculty of Medicine, Stanford University School of Medicine, University of Minnesota Medical School, Yale University School of Medicine, Duke University School of Medicine and the Division of Biological Sciences of the University of Chicago.

Other grants announced in the report are: $110,000 to the Association of American Medical Colleges for research in medical education, including a study of premedical education in the liberal arts colleges and an analysis of medical students' records for the past fifteen years; $10,000 to the Educational Testing Service for the development of objective examinations for licensing of practitioners; $100,000 to the Social Science Research Council for a series of inter-university summer seminars on research problems in the social sciences; and $100,000 to the American Council of Learned Societies for grants to enable young college faculty members teaching the humanities "to study subject matter which was not a part of their previous narrow training or experience, but for which they now recognize the need."

Scholars in Medical Science

The major program of the Foundation, toward which $1,200,000 has been appropriated, is the support of selected young doctors starting careers in academic medicine. Under this plan, 47 Scholars in Medical Science, ranging in age from 26 to 35, on the faculties of 35 medical schools are being helped through "the critical years" until they become established as teachers and investigators. The Foundation grants $25,000 to the medical school over a five year period toward the support of each Scholar. More than one-third of the medical schools in the United States and Canada have at least one Scholar on their staffs and three schools have as many as three Scholars.

Need for Men

The report emphasizes the need for young, "broad-gauged" men in medical education, the social sciences and the humanities "who have gone beyond the pattern of narrow departmental training and are strong enough to break through the ivory curtain separating these fields."

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The Mississippi Plan

The State of Mississippi has an active and progressive plan for obtaining more family doctors by assisting deserving Mississippi medical students to complete medical training and enter practice in their home state. To date, 270 young Mississippians have been approved by the Board for loans with which to complete medical training. This group includes more than 20 already in active practice, all living and practicing in rural sections of the State. More than 30 are now in internship. During the school year 1950-1951, approximately 200 of these loan recipients will be enrolled in 24 medical schools throughout the nation. The student has choice of any approved medical school in the United States. First year medical students are enrolled in eight different schools, as compared with six last year. Students entered first year medicine this fall at these schools: Duke, Jefferson, George Washington, Mississippi, Tulane, Vanderbilt, Meharry, and Howard.

These young people have signed State contracts agreeing to approved rural areas (towns of 5,000 and less) for early years

of practice. If the young physician remains in such an approved rural area for five years his entire loan, not to exceed a maximum of $5,000 plus 4 per cent interest, is completely credited to him. He may leave after a minimum period of two years, for which all loan recipients are obligated, if he wishes to pay off in cash with interest the three-fifths of his loan which he still owes at the end of that period. He may receive credit on loan, however, so long as he remains in any approved rural area. Nine of the net increase of 24 physicians in Mississippi during the last six months are participants in this program. Thus, Mississippi's medical education loan program accounts for 37 per cent of the net increase of the physicians in the State.

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Joseph Collins Foundation

Dr. Joseph Collins, a neurologist who died June 11, left his residuary estate for the establishment of the Joseph Collins Foundation. Dr. Collins suggested that annual awards of $1,500 each be made to "serious and cultured young men and women who are ambitious and determined and who are without sufficient means to study medicine." They may be students at the medical schools of Cornell, Johns Hopkins, Harvard, Columbia or the University of Virginia.

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Fellowship in Industrial Health

The Institute of Industrial Health of the University of Cincinnati will accept applications for a limited number of Fellowships which are being offered to qualified candidates who wish to pursue a graduate course of instruction which will qualify them for the practice of Industrial Medicine. Candidates who complete satisfactorily the course of study will be awarded the degree Doctor of Industrial Medicine. Any registered physician, who is a graduate of an approved medical school and who has completed satisfactorily two years of residency (including internship) in a hospital accredited by the American Medical Association may apply for a Fellowship in the Institute of Industrial Health. The course of instruction consists of a two-year period of intense preliminary training in the basic phases of Industrial Medicine followed by one year of practical experience under adequate supervision in industry. During the first two years, the stipends for the Fellowships vary from $2,100 to $3,000. In the third year the candidate will be compensated for his service by the industry in which he is completing his training. Requests for additional information should be addressed to the Institute of Industrial Medicine, College of Medicine, Cincinnati 19, Ohio.

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U. S. Public Health Service Examination for Psychologist

Examinations for psychologist in the Regular Commissioned Corps of the Public Health Service will be held December 11, 12, and 13, in various cities throughout the country. Completed applications must be in the Washington office by November 13. Appointments are permanent and provide opportunities for career service in clinical psychology and research. Benefits include periodic pay raises and promotions; liberal retirement provision; medical care; annual and sick leave.

Appointments will be made in the grades of Assistant and Senior Assistant, equivalent to Army ranks of 1st. Lieutenant and Captain, respectively. Entrance pay is $3,811 for Assistant (with dependents) and $4,489 for Senior Assistant (with dependents), including rental and subsistence allowance. Applicants must expect to receive the doctor's degree in psychology no later than September, 1951.

For application forms and additional information write to: Surgeon General, United States Public Health Service, Federal Security Agency, Washington 25, D. C., Attention: Division of Commissioned Officers.

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American College of Physicians

The Midwest Regional Meeting of the American College of Physicians will be held at the Memorial Union Theater on the campus of the University of Wisconsin in Madison. November 18, 1950. The day will be filled by the presentation of

scientific papers. In addition, a scientific exhibit will be provided in the foyer of the Memorial Union Theater.

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Fellowships in Public Health

The New York State Department of Health announces the availability of Fellowships in Public Health. The Fellowships are for a period of from one to two years and provide for residency training as well as for a postgraduate academic year in a school of public health. The Fellowship stipened is from $2,400 to $4,200 per year depending on the type of training provided.

Applicants must be graduates of medical colleges approved by the American Medical Association or of foreign medical schools whose graduates have been recommended by the American Medical Association for consideration on the same basis as graduates of approved medical schools in the United States, and must have completed at the time of beginning the Fellowship at least one year's approved internship. They must be eligible for license to practice medicine in New York State and should be interested in and eligible to enter public health service in New York State upon completion of the Fellowship.

Applications and further information may be obtained by writing to Dr. Franklyn B. Amos, Director of Professional Training, New York State Department of Health, Albany 1, New York.

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Medical Internships,
U. S. Public Health Service

The Public Health Service is offering 122 approved one year rotating internships in eleven of its U. S. Marine Hospitals to begin July 1, 1951. These internships are open to graduates of approved medical schools. Appointments are made on a competitive basis according to the Uniform Intern Placement Plan. Successful applicants must qualify for a commission as Assistant Surgeon in the Reserve Corps of the Public Health Service and express an intent to serve an additional year with the Public Health Service after completion of his internship. Following internship there are many and various opportunities in the Public Health Service in practically all fields of medicine, including clinical care of patients, research, preventive medicine and public health. In addition, the Public Health Service is the medical corps for the U. S. Coast Guard and supplies officers to the Point IV Program.

Applications and further information may be obtained by writing to the Public Health Service, Federal Security Agency, Washington 25, D. C., Attention: Chairman, Committee on Residencies and Internships.

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Health Resources
Advisory Committee

Officially announced is makeup of Health Resources Advisory Committee to National Security Resources Board, which will have formidable responsibilities, possibly including that of advising Selective Service on drafting of doctors. Members are: Drs. James C. Sargent and Harold S. Diehl, American Medical Association; Dr. Leo J. Schoeny, representing American Dental Association; Dr. William P Shepard for public health; Dr. John Pastore, for hospitals; Mrs. Ruth Kuehn, nursing dean at University of Pittsburg; David M. Heyman, board chairman of Health Insurance Plan of Greater New York, and Dr. Howard A. Rusk, New York University Bellevue Medical Center, chairman.

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Muscular Dystrophy
Research Foundation

This foundation was chartered by the State of Texas to raise funds for research in the cause and treatment of muscular dystrophy, to arouse more interest and help within the medical profession and to inform the public of the disease. The president is Dr. Albert L. Delaney, Liberty, Texas, and the executive secretaries are Sallie and Nadine Woods of Liberty. The address is P. O. Box 384, Liberty, Texas.

Book News

Principles of Internal Medicine

T. R. Harrison, editor-in-chief; assisted by numerous contributors. The Blakiston Company, Philadelphia. 1950. Price, $12.

The chief aim of the authors is to integrate the pertinent continent of the preclinical sciences with clinical medicine and to approach the subject not only from the standpoint of disorders of structure, but also by way of abnormal physiology, chemistry and disturbed psychology. This follows the modern trend in medical education. It makes for a rational understanding of the how, the why and the wherefore of diseases and their management. The introduction "approach to the patient" is excellent. The text is divided into seven parts: I, Cardinal manifestations of disease; II, Physiologic considerations; III, Reactions to stress and to antigenic substances; IV, Metabolic and endocrine disorders; V, Disorders due to chemical and physical agents; VI, Diseases due to biologic agents; VII, Diseases of organ systems. The enormous size of the book is disturbing. The index deserves special mention.

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Thoracic Surgery

By Richard H. Sweet, M.D., Associate Clinical Professor of Surgery, Harvard University Medical School. With illustrations by Jorge Ro. Arroyo, M.D., Asistant in Surgical Therapeutics, University of Mexico Medical School. W. B. Saunders Company, Philadelphia. 1950. Price, $10.

Scope limited as indicated by the title of the book; directed to qualified surgeons. After introductory chapters on general technical procedures and thoracic incisions, through the surgery of the chest wall, the pleural cavity, the lungs and the mediastinum including the heart and great vessels, the thoracic duct and the seophagus. A separate chapter is devoted to the subject of abdominal operations performed through thoracic insicions. The final chapter deals with the surgery of the diaphragm. Only operations which have been found useful in everyday practice are given thorough consideration.

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Freud: Dictionary of Psychoanalysis

Edited by Nandor Fedor and Frank Gaynor, with a preface by Theodore Reik. Philisophical Library, New York. 1950. Price, $0.75.

Essentials of Ophthalmology

Roland I. Pritikin, M.D., Eye Surgeon, Rockford (Ill.) Memorial (and other hospitals) Hospital. J. B. Lippincott Company, Philadelphia, 1950. Price, $7.50

A handbook for the general practitioner, giving essential information on the eye and its diseases. Basic aspects of anatomy, physiology, embryology and optical science are stressed. The analysis and correction of refractive errors and their correction has special value. A chapter on industrial ophthalmology is included plus many good illustrations, some in color, and a brief bibliography.

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Handbook of Physiology and Biochemistry

R. J. S. McDowell, M.D., Professor of Physiology, University of London, King's College. 40th Centenary Edition. The Blakiston Company, Philadelphia. 1950. Price, $7.

A student text; emphasis being placed on principles rather than details and on those parts of the subject which are of the most practical value. The two subjects are discussed simultaneously favoring correlation. Well illustrated with an extensive bibliography.

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Medical Parasitology

William G. Sawitz, M.D., Associate Professor of Parasitology, Jefferson Medical College. The Blakiston Company, Philadelphia. 1950. Price, $4.25

A lecture and laboratory guide, presenting the subject from the medical point of view. Morphological details are often omitted unless they contribute to understanding of pathogenesis and epidemiology. Treatment is discussed in a separate chapter. The book gives the student all he needs to know about the subject.

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Management of Obstetric Difficulties

By Paul Titus, M.D., Obstetrician and Gynecologist to St. Margaret's Hospital, Pittsburgh. Ed. 4. The C. V. Mosby Company, St. Louis. 1950. Price, $14.

Completely revised and brought up to date.

Midwifery

R. Christie Brown, M.B., Obstetric Surgeon City of London Maternity Hospital; Barton Gilbert, M.D., Obstetrician and Gynecologist City of London Maternity Hospital; and Richard H. Dobbs, M.D., Assistant Physician Children's Department, London Hospital. ed. 3. The Williams & Wilkins Company, Baltimore. 1950. Price, $4.

Presenting the principles and practice of midwifery for pupil midwives, teacher midwives and obstetric dressers.

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A Guide to Psychiatric Books: With a Suggested Basic Reading List

By Karl A. Menninger, M.D., General Director of the Department of Education of the Menninger Foundation, with the collaboration of Gegorge Devereux, Ph.D., Lecturer in Anthropology, Menninger School of Psychiatry. Grune & Stratton, New York. 1950. Price, $3.50

Presenting 1,164 bibliographic references for those who are interested in this field.

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Clinical Electrocardiography

Francis F. Rosenbaum, M.D., Assistant Clinical Professor of Medicine, Marquette University School of Medicine; edited by Henry A. Christian, M.D., Hersey Professor of the Theory and Practice of Physic, Emeritus, Harvard University. Oxford University Press, New York. 1950. Price $4.50

Reprinted from Oxford Loose Leaf Medicine with the same page numbers as in that text.

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Textbook of Bacteriology

By Joseph M. Dougherty, Ph.D., Dean of the School of Science and Professor of Bacteriology, Villanova College, and Anthony J. Lamberti, M.S., Instructor in Bacteriology and Parasitology, Temple University School of Medicine. Ed. 2. The C. V. Mosby Company, St. Louis. 1950. Price, $5.75.

Revised; new material added; designed for the undergraduate student by avoiding an exhaustive treatment of the subject.

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Textbook of Abnormal Psychology

By Roy M. Dorcas, Professor of Psychology, University of California, and G. Wilson Shaffer, Professor of Psychology, Johns Hopkins University. Ed. 4. The Williams & Wilkins Company, Baltimore. 1950. Price, $5.

Rewritten and brought up to date.

An Atlas of Human Anatomy

By Barry J. Anson, Ph.D., Professor of Anatomy, Northwestern University Medical School. W. B. Saunders Company, Philadelphia. 1950. Price, $11.50.

A very fine presentation of the anatomy of the human body by means of many hundreds of exquisite drawings. This is another atlas which should have a definite appeal to students. The illustrations are based on new dissections, serially prepared.

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Eyes and Industry (Formerly Industrial Ophthalmology)

By Hedwig S. Kuhn, M.D., Industrial Ophthalmologist. Ed. 2. The C. V. Mosby Company, St. Louis. 1950. Price, $8.50.

A coordination of essential information relating to the various problems that confront industry and which also bear a special relationship to ophthalmology.

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Pathologic Physiology: Mechanisms of Disease

Edited by William A. Sodeman, M.D., William Henderson, Professor of the Prevention of Tropical and Semitropical Diseases, Tulane University of Louisiana School of Medicine, with the cooperation of twenty-four associates. W. B. Saunders Company, Philadelphia. 1950. Price, $11.50.

The authors approach their problems from the standpoint of disturbed physiology. They analyze symptoms and signs and the mechanisms of their development; discuss why and how symptoms appear, presenting a clinical picture of disease seen as a physiologic dysfunction.

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Physiology and Anatomy

By Esther M. Greisheimer, M.D., Professor of Physiology, Temple University School of Medicine. Ed. 6. J. B. Lippincott Company, Philadelphia. 1950. Price, $4.

The chapters on the physiology of the muscular system have been revised, also on the blood. Pain and visceral sensation are treated more adequately and a more extensive discussion on hemorrhage and shock has been added. The chapter on the physiology of respiration has been rewritten. The chapter on internal secretions h[illegible]en revised.

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The Legacy of Maimonides

By Ben Zion Bokser. Philosophical Library, New York. 1950. Price, $3.75.

Textbook of Histology

By E. V. Cowdry, Professor of Anatomy Washington University School of Medicine. Ed. 4. Lea & Febiger, Philadelphia. 1950. Price, $8.50.

This book does not need an introduction. It has been thoroughly revised and rearranged to improve it as a text for students.

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The Meaning and Practice of Psychotherapy

By V. E. Fisher, Ph.D., Assistant Professor of Psychology and Director of the Mental Clinic, New York University. The Macmillan Company, New York. 1950. Price, $5.

A discussion of psychotherapy as a science based on the author's experiences.

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An Introduction to Pathology

By G. Payling Wright, D.M., Professor of Pathology, Guy' Hospital Medical School, University of London. Longmans Green and Co., London. 1950. Price, $6.

Mainly for students. Sets out the main principles of disease processes, laying special emphasis on etiology and pathogenesis. Stresses pathology as an aspect of disturbed physiology thus linking it more closely with clinical medicine and surgery. The book is well illustrated.

✚ ✚

McClung's Handbook of Microscopical Technique

By thirty-five authors. Edited by Ruth McClung Jones, Professor of Biology, Winthrop College, South Carolina. Ed. 3. Paul B. Hoeber, Inc. Medical Book Department of Harper & Brothers, New York. 1950. Price, $12.

For workers in animal and plant tissues.

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The Physician Examines the Bible

By G. Raimer Smith, M.D. Philosophical Library, New York. 1950. Price, $4.25.

The author examines the bible as to etiology, diagnosis and prognosis. Medical subjects in the Old and New Testament and Apocrypha are presented and compared with present day practices.

THREE NEW LEA & FEBIGER BOOKS

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Radiologist, Massachusetts General Hospital; Instructor in Radiology, Harvard Medical School

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SUBJECT INDEX FOR VOLUME 25

A

Address of president, (Hinsey), 379 (Nov.).
Address of president, (Miller), 1 (Jan.).
American Association of Blood Banks annual meeting, 300 (Jy.).
American Board of Nutrition, 234 (May).
American College of Physicians, research fellowships, 300 (Jy.).
midwest regional meeting, 456 (Nov.).
American Heart Association career investigators, 300 (Jy.).
American Pharmaceutical Manufacturer's Assn. 1949 award ceremony, 185 (May).
Anatomy, teaching of in medical schools of Mexico City (Evans), 41 (Jan.).
teaching, of nerve supply of abdominal digestive tract (DeGaris), 417 (Nov.).
Applicants accepted by medical schools, 289 (Jy.).
for admission to U. S. medical colleges, preliminary report on (Stalnaker; Hillhouse), 284 (Jy.).
for 1950 freshman class, initial report, 223 (May).
Argentina, new medical school in, 298 (Jy.).
Armed Forces Medical School, 358 (Sept.).
Arthritis and rheumatism research fellowships, 371 (Sept.).
Association, medical teachers, (Waite), 202 (May).
Association Schools of Public Health meeting, 234 (May).
Atomic energy commission fellowships, 372 (Sept.).
Atomic warfare, physicians training against, 223, 224 (May).

B

Bibliography, medical, professor of 76 (Jan.).
Bloedorn, Walter A., reply to "medical colleges assailed." 142 (Mar.).
Borden Award for 1949 to Fuller Albright, 146 (Mar.).
for 1950 to Gerty T. Cori, 446 (Nov.).
in medical sciences, 139 (Mar.), 222 (May).
Brandies University, 235 (May.).
Buffalo (N. Y.) endorses medical research, 299 (Jy.).

C

Cancer training and research, 371 (Sept.).
Cardiovascular disease, audiovisual aids in teachings of conference, 288 (Jy.).
Catalogs, a format for medical school (Slaughter), 255 (Jy.).
Chest, education in disease of (Doan), 90 (Mar.).
Clerkships, clinical, ROTC, 287 (Jy.).
clinical, U. S. Air Force, 234 (May).
Clinicopathologic conference, student; device for teaching advanced pathology (Lev; Meredith), 200 (May).
Collins, Joseph. Foundation, 456 (Nov.).
Committees of A. A. M. C., 146 (Mar.).
Conference on audiovisual aids in the teaching cardiovascular diseases, 288 (Jy.).
Curriculum, building a, 77 (Jan.).
graded, advent of in American Medical Colleges, 315 (Sept.).
planning, leadership in (Turner; Darley), 12, (Jan.).
integration of, 59 (Jan.).
of clinical years, 60 (Jan.).

D

Domiciliary medical care program as an integrated facility in the medical curriculum (Bakst), 406 (Nov.).

E

Editorials: 59 (Jan.); 141 (Mar.); 211 (May); 287 (Jy.); 355 (Sept.), 443 (Nov.).
Education, graduate medical, in U. S. Army General Hospitals (Curran), 122 (Mar.).
in diseases of the chest (Doan), 90 (Mar.).
medical, as education (Klapper), 312 (Sept.)
medical, cost (James) 192 (May).
medical, financing, 443 (Nov.).
medical, in time of national emergency, supplement (Nov.).
medical, in U. S. and Canada, 445 (Nov.).
medical, new use of TV revealed by Remington-Rand, Inc., 156 (Mar.).
medical, reform in, 59 (Jan.).
medical, report of committee on financial aid to, 100 (Mar.).
medical, sketches of: I. Quizzes and lectures, Gerundo; 330 (Sept.).
medical, state support of in New York (Olson), 129 (Mar.).
medical, survey on, 446 (Nov.).
medical, takes inventory (Casberg), 305 (Sept.).
medical, thoughts on by general practitioner (Miller), 213 (May).
medical utilization of regional hospitals for (Wilkinson) 26 (Jan.).
medical, ultimate aim, 62 (Jan.).
premedical, national conference on, 370 (Sept.).
primary aim of, 77 (Jan.).

F

Faculty, medical, maintaining a continuing supply (Hinsey), 379 (Nov.).
Fellowship graduate industrial hygiene, 371 (Sept.).
in dermal pathology, 300 (Jy.).
Fellowships, arthritis and rheumatism research, 371 (Sept.).
atomic energy commission, 372 (Sept.).
in industrial health, 456 (Nov.).
in public health, 457 (Nov.).
offered by National Foundation for Infantile Paralysis, 155 (Mar.).
postgraduate research by National Foundation for Infantile Paralysis, 76 (Jan.).
research, American College of Physicians, 300 (Jy.).
Film production, principles of scientific teaching (Elias), 333 (Sept.).
Films, Veteran's Administration, 156 (Mar.).
Financial aid to medical education report of committee, 100 (Mar.).
Financing medical education, 443 (Nov.).
Foundation, Joseph Collins, 456 (Nov.).
Foundation Muscular Dystrophy Research, 457 (Nov.).

Fulbright Act, educational exchange activities under, 157 (Mar.); 357 (Sept.).
Fulbright program, 298 (Jy.).
Fund, life insurance medical research, 298 (Jy.).

G

G. I. students in 1949-1950 freshman class, 289 (Jy.).
General practice, physicians entering, 445 (Nov.).
Great Britain, training of doctors in (Kelynack), 50 (Jan.).

H

Harvard University, report of president, 143 (Mar.)
Health, community, use of automatic projector for collateral film course (Stubbs; Ruhe; Griswold) 53 (Jan.).
industrial, fellowship in, 456 (Nov.).
legislation and shortage of physicians, (Davison), 396 (Nov.).
Health Resources Advisory Committee, 457 (Nov.).
Hospitals, regional, utilization of for medical education (Wilkinson), 26 (Jan.).

I

Industrial hygiene engineering fellowship, 371 (Sept.).
Interns, cooperative plan for appointment of, 75 (Jan.).
U. S. Public Health Service, 236 (May).
Internship, a planned educational experience (Youmans), 21, (Jan.).
individualized (Craig; Naish; Buchanan), 111 (Mar.).
Internships and residencies; report by N. Y. committee on study of, 204 (May).
report on (A. M. A. J.), 224 (May).
U. S. P. H. Service, 457 (Nov.).
U. S. Navy, for 1951 graduates 299 (Jy.).
Israel, health conditions in, 372 (Sept.).

J

John J. Abel prize in pharmacology awarded to Dr. George B. Koelle by American Society for Pharmacology and Experimental Therapeutics, 301 (Jy.).

L

Licensure statistics for 1949, 288 (Jy.).
Life Insurance medical research fund, 298 (Jy.).
Library, medical, scholarships for students, 301 (Jy.).

M

Maintenance of continuing supply of new faculty members (Hinsey), 379 (Nov.).
Markle Fund for appraising medical students, 76 (Jan.).
grants for medical school faculty support, 235 (May); 455 (Nov.).
Medical College Admission Test, check studies on predictive value of (Taylor), 269 (Jy.).
colleges assailed, 141 (Mar.).
Education, 444 (Nov.).
education in time of national emergency, supplement (Nov.).
Film Institute, report of, 139 (Mar.); 355, 370 (Sept.).
illustrators director available, 373 (Sept.).
Medicine preventive, and public health, short answer type of examination in a course on (Barnes), 272 (Jy.).
preventive, in tomorrow's world (Meleney), 102 (Mar.).
preventive, opportunities in the teaching of (Scheele), 241 (Jy.).
social responsibilities of (Hanchcr), 81 (Mar.).
social, teaching of, 61 (Jan.).
Meeting, Lake Placid, 444 (Nov.).
Microfilms, University, 155 (Mar.).
Midwest medical schools meet, 370 (Sept.).
Mississippi plan, 455 (Nov.).
Modification of cooperative plan for appointment of interns, 435 (Nov.).

N

National Board of Medical Examiners annual meeting, 301 (Jy.).
associate secretary appointed, 236 (May).
National Conference on Premedical Education, 370 (Sept.).
National Foundation for Infantile Paralysis fellowships, 155 (Mar.).
National Society for Medical Research, report on, 279 (Jy.); 371 (Sept.).
Navy internships for 1951, 299 (Jy.).
New York State Board of Regents visit medical colleges in Italy, 235 (May).
New York, state support of medical education in (Olson), 129 (Mar.).
News, book: 78 (Jan.); 158 (Mar.); 237 (May); 302 (Jy.); 373 (Sept.); 458 (Nov.).
college: 65 (Jan.); 147 (Mar.); 225 (May); 290 (Jy); 360 (Sept.); 447 (Nov.).
general: 76 (Jan.); 155 (Mar.); 234 (May); 298 (Jy.); 370 (Sept.); 455 (Nov.).

O

Osler's influence (Davison), 161 (May).

P

Passano Foundation Award, 236 (May).
Pathology, advanced, student clinico-pathologic conference, device for teaching (Lev; Meredith), 200 (May).
dermal, fellowship in 300 (Jy.).
Pediatrics, instruction of medical student in (Craig, Naish, Buchanan): 117 (Mar.).
Physician shortage and health legislation, (Davison), 396 (Nov.).
Premedical, 356 (Sept.).
Prizes for medical students (BMA), 76 (Jan.).
Proposal for supplementing the cooperative plan for appointment of interns (Mullin), 437 (Nov.).
Psychiatry, pediatric, teaching of in a setting of medical clerkships (Marx; Jenkins), 323 (Sept.).
teaching of, integration in undergraduate curriculum, 207 (May)
Psychologist, U. S. Public Health Service, 456 (Nov.).
Psychotherapy, postgraduate instruction in (Cameron), 338 (Sept.).
Teaching to medical students (Strauss), 263 (Jy.).

R

Report of committee on financial aid to medical education, 100 (Mar.).
Medical Film Institute, 139 (Mar.).

Curriculum planning (Darley, Turner), 12 (Jan.).
Internship, a planned educational experience (Youmans), 21 (Jan.).
Student selection (Jacobsen), 7 (Jan.).
Research, a formula to determine the cost of (Weaver), 248 (Jy.).
fund, medical, life insurance, 298 (Jy.).
in orthopedic surgery, Kappa Delta award, 236 (May).
medical, Buffalo (N. Y.) endorses, 299 (Jy.).
present place of in medical curriculum (Green; May), 345 (Sept.).
Residencies and internships, report on by N. Y. Committee, 204 (May).
ROTC clinical clerkships, 287 (Jy.).
Rutgers Virus Research Laboratory, 235 (May).

S

Scholarships for cerebral palsy training, 299 (Jy.).
for medical library students, 301 (Jy.).
Fulbright, 77 (Jan.). 157 (Mar.).
Service medicine's ante to medical training and preparedness (Pugh), 174 (May).
Student selection problem (Jacobsen), 7 (Jan.).
Surgery, orthopedic, Kappa Delta award for research in, 236 (May).
plastic, award offered by American Society of Plastic and reconstructive Surgery, 301 (Jy.).
Survey on medical education, 446 (Nov.).
selection of, 59 (Jan.).
medical, training college for, 62 (Jan.).

T

Teachers, medical, association (Waite) 202 (May).
Teaching advanced pathology; clinicopathologic conference, device for (Lev; Meredith) 200 (May).
anatomy, gross, in medical schools of Mexico City (Evans), 41 (Jan.).
anatomy of nerve supply of abdominal digestive tract (DeGaris), 417 (Nov.).
clinical, 60 (Jan.).
in medical colleges, how to improve (Slobody), 45 (Jan.).
pediatrics (Craig, Naish, Buchanan), 117 (Mar.).
pediatric phychiatry in a setting of medical clerkships (Marx; Jenkins), 323 (Sept.).
preventive medicine (Scheele), 241 (Jy.).
psychiatry (Ripley), 207 (May).
psychotherapy to medical students (Strauss), 263 (Jy.).
of social medicine, 61 (Jan.).
Test, medical college admission, 155 (Mar.); (Stalnaker, 428 (Nov.).
medical college admission, check studies on value of (Taylor), 269 (Jy.).
Tests, professional aptitude and general aptitude (Ralph & Taylor), 33 (Jan.).
TV, new use of in medical education 156 (Mar.).

U

University microfilms, 155 (Mar.).
University of Puerto Rico School of Medicine, 236 (May).
Urology award, 370 (Sept.).
U. S. Air Force clinical clerkships, 234 (May).
U. S. Army training program, 221 (May).
U. S. Public Health Service interns, 236 (May).
U. S. Public Health Service Laboratory training courses, 77 (Jan.).

V

Veteran's Administration films, 156 (Mar.).

W

Winthrop-Stearns Research Institute, 156 (Mar.).

AUTHOR'S INDEX FOR VOLUME 25

B

Bakst, Henry J.: Domiciliary medical care program as an integrated facility in medical curriculum, 406 (Nov.).
Barnes, M. E.: Short answer type of examination in course on preventive medicine and public health in college of medicine, 272 (Jy.).
Buchanan, Michael, F. G., Craig and Naish: Instruction of medical student in pediatrics, 117 (Mar.).

C

Cameron, D. Ewen: Postgraduate instruction in psychotherapy, 338 (Sept.).
Casberg, Melvin A.: Medical education takes inventory, 305 (Sept.).
Craig, Stuart W., Naish, Francis C. & Buchanan, Michael F. G.: Instruction of medical student in pediatrics, 117 (Mar.).
Curran, Jean A.: Graduate medical education in U. S. Army General Hospitals, 122 (Mar.)

D

Darley, Ward & Turner, Edw. L.: Leadership in curriculum planning, 12 (Jan.).
Davison, Wilburt C.: Health legislation and shortage of physicians, 396 (Nov.).
Osler's influence, 161 (May).
DeGaris, Chas. F.: Teaching anatomy of nerve supply of abdominal digestive tract, 417 (Nov.).
Doan, Chas. M.: Education in disease of the chest, 90 (Mar.).

E

Elias, Hans.: Principles of scientific teaching film production, 333 (Sept.).
Evans, F. Gaynor: Teaching of gross anatomy in the medical schools of Mexico City, 41 (Jan.).

G

Gerundo, Michele: Sketches of medical education: I—quizzes & lectures, 330 (Sept.).

Green, C. R., Jr. & R. D. May: Present place of undergraduate research in the medical curriculum, 245 (Sept.).

Griswold, Gale H., Stubbs and Ruhe: Use of an automatic projector for a collateral film course in community health, 53 (Jan.).

H

Hancher, Virgil M.: The social reponsibilities of medicine, 81 (Mar.).

Hinsey, Jos. C.: Maintenance of a continuing supply of new faculty members, 379 (Nov.).

reply to "medical colleges assailed." 141 (Mar.).

1949 Scientific award ceremony Am. Pharmaceutical Manufacturer's Assn., 185 (May).

J

Jacobsen, Carlyle: Student selection problem, 7 (Jan.).

James, F. Cyril: Cost of medical education, 192 (May).

Jenkins, Wm. C. & Marx, Johann R.: Teaching pediatric psychiatry in a setting of medical clerkships, 323 (Sept.).

K

Kelynack, Agnes: Training of doctors in Britain, 50 (Jan.).

Klapper, Paul: Medical education as education, 312 (Sept.).

L

Lev, Maurice, & Meredith, Paul A.: Student clinicopathologic conference: device for the teaching of advanced pathology, 200 (May.)

Luchessi, P. F. & Waife, S. O.: The individualized internship, 111 (Mar.).

M

Marx, Johann R. & Jenkins, Wm. C.: Teaching of pediatric psychiatry in a setting of medical clerkships, 323 (Sept.).

Meleney, Henry E.: Preventive medicine in tomorrow's world, 102 (Mar.).

Meredith, Paul A. & Lev, Maurice: student clinicopathologic conference; device for teaching advanced pathology, 200 (May).

Miller, D. G.: Thoughts on medical education by general practitioner, 213 (May).

Miller, J. Roscoe: Address of president, 1 (Jan.).

Mullin, F. J.: A proposal for supplementing the cooperative plan for appointment of interns, 437 (Nov.).

N

Naish, Francis C., Craig & Buchanan, Instruction of the medical student in pediatrics, 117 (Mar.).

O

Olson, Stanley W.: State support of medical education in New York, 129 (Mar.).

P

Pugh, Lamont: Service medicine's ante to medical training and national preparedness, 174 (May).

R

Ralph, Ray B. & Taylor, Calvin W: Comparative evaluation of the professional aptitude test and the general aptitude test battery, 33 (Jan.).

Ripley, Herbert S.: Integration of psychiatric teaching in undergraduate curriculum, 207 (May).

Ruhe, David S., Stubbs & Griswold: Use of an automatic projector for a collateral film course in community health, 53 (Jan.).

S

Scheele, Leonard A.: Opportunities in teaching of preventive medicine, 241 (Jy.).

Slaughter, Donald: A format for medical school catalogs, 255 (Jy.).

Slobody, Lawrence B.: How to improve teaching in medical colleges, 45 (Jan.).

Stalnaker, John M.: Medical college admission test, 428 (Nov.).

Stalnaker, John M., and James N. Hillhouse: Preliminary report of applicants for admission to U. S. medical colleges, 284 (Jy.).

Strauss, Bernard V.: Teaching psychotherapy to medical students, 263 (Jy.).

Stubbs, Trawick H., Ruhe, David S. & Griswold, Gale H.: Use of an automatic projector for collateral film course in community health, 53 (Jan.).

T

Taylor, Calvin W.: Check studies on predictive value of medical college admission test, 269 (Jy.).

Taylor, Calvin W. & Ralph, Ray B: Comparative evaluation of professional aptitude test and general aptitude test battery, 33 (Jan.).

Turner, Edward L. & Darley, Ward: Leadership in curriculum planning, 12 (Jan.).

W

Waife, S. O. & Luchessi, P. F.: The individualized internship, 111 (Mar.).

Waite, Frederick C.: Advent of the graded curriculum in American Medical Colleges, 315 (Sept.).

Medical Teachers Association, 202 (May).

Ware, Martin: Britain's Medical Research Council, 279 (Jy.).

Weaver, Harry M.: A formula to determine the cost of research, 248 (Jy.).

Wilkinson, Chas. F., Jr.: Utilization of regional hospitals for medical education, 26 (Jan.).

Y

Youmans, John B.: Making the internship a planned educational experience, 21 (Jan.).

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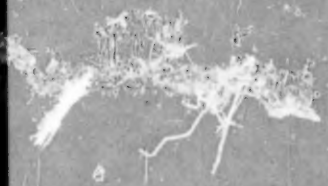

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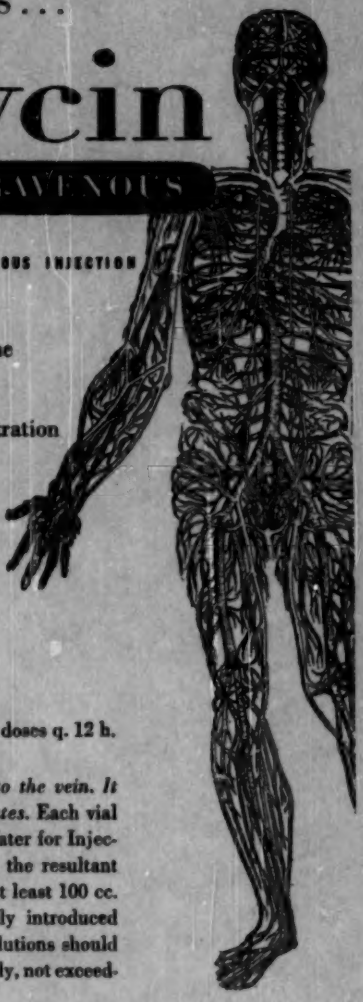

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